



## SEQUENCE LISTING

<110> Sherman, David H.  
Liu, Hung-Wen  
Xue, Yongquan  
Zhao, Lishan  
Regents of the University of Minnesota, et al.

<120> Promoter for Methymycin and Pikromycin

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<140> 09/988,384

<141> 2001-11-19

<160> 62

<170> FastSEQ for Windows Version 4.0

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<211> 15872

<212> DNA

<213> Streptomyces venezuelae

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<212> PRT

<213> *Streptomyces venezuelae*

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Ala	Val	Thr	Asp	Val	Pro	Ser	Gly	Arg	Trp	Thr	Ser	Val	Leu	Gly	Gly
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Ala	Asp	Ala	Glu	Glu	Pro	Ala	Glu	Ser	Gly	Val	Arg	Arg	Gly	Gly	Phe
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Leu	Asp	Ser	Leu	Asp	Leu	Phe	Asp	Ala	Ala	Phe	Phe	Gly	Ile	Ser	Pro
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Arg	Tyr	Gly	Ala	Ser	Phe	Glu	Glu	Glu	Leu	Leu	Thr	Gly	Gln	Phe	Thr
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Ile	Asp	Pro	Thr	Pro	Pro	Ser	Leu	Arg	Leu	Asp	Thr	Gly	Leu	Pro	Thr
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Val	Gly	Met	Arg	Tyr	Val	Pro	Tyr	Asn	Gly	Thr	Ser	Val	Val	Pro	Asp
625					630					635					640
Trp	Leu	Ser	Glu	Pro	Ala	Arg	Pro	Arg	Val	Cys	Leu	Thr	Leu	Gly	
				645					650				655		
Val	Ser	Ala	Arg	Glu	Val	Leu	Gly	Gly	Asp	Gly	Val	Ser	Gln	Gly	Asp
			660					665					670		
Ile	Leu	Glu	Ala	Leu	Ala	Asp	Leu	Asp	Ile	Glu	Leu	Val	Ala	Thr	Leu
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	690					695					700				
Phe	Thr	Asp	Phe	Val	Pro	Met	His	Ala	Leu	Leu	Pro	Ser	Cys	Ser	Ala
705					710						715				720
Ile	Ile	His	His	Gly	Gly	Ala	Gly	Thr	Tyr	Ala	Thr	Ala	Val	Ile	Asn
				725					730					735	
Ala	Val	Pro	Gln	Val	Met	Leu	Ala	Glu	Leu	Trp	Asp	Ala	Pro	Val	Lys
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		755					760					765			
Glu	Leu	Thr	Pro	Gln	Ala	Val	Arg	Asp	Ala	Val	Val	Arg	Ile	Leu	Asp
	770					775						780			
Asp	Pro	Ser	Val	Ala	Thr	Ala	Ala	His	Arg	Leu	Arg	Glu	Glu	Thr	Phe
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Gly	Asp	Pro	Thr	Pro	Ala	Gly	Ile	Val	Pro	Glu	Leu	Glu	Arg	Leu	Ala
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Ala	Gln	His	Arg	Arg	Pro	Pro	Ala	Asp	Ala	Arg	His	Met	Tyr	Glu	Val
			820					825					830		
Asp	His	Ala	Asp	Val	Tyr	Asp	Leu	Phe	Tyr	Leu	Gly	Arg	Gly	Lys	Asp
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Leu	Glu	His	Phe	Thr	Lys	Glu	Phe	Gly	Asp	Thr	Ala	Gly	Leu	Glu	Leu
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Ser	Glu	Asp	Met	Leu	Thr	His	Ala	Arg	Lys	Arg	Leu	Pro	Asp	Ala	Thr
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Ala	Val	Val	Ser	Met	Phe	Ser	Ser	Val	Gly	Tyr	Leu	Lys	Thr	Thr	Glu
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Gly	Val	Val	Val	Val	Glu	Pro	Trp	Trp	Phe	Pro	Glu	Thr	Phe	Ala	Asp	965	970	975	
Gly	Trp	Val	Ser	Ala	Asp	Val	Val	Arg	Arg	Asp	Gly	Arg	Thr	Val	Ala	980	985	990	
Arg	Val	Ser	His	Ser	Val	Arg	Glu	Gly	Asn	Ala	Thr	Arg	Met	Glu	Val	995	1000	1005	
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Pro	Arg	Val	Arg	Arg	Gly	Arg	Thr	Thr	Pro	Arg	Ala	Phe	Thr	Leu	Ala	1075	1080	1085	
Val	Val	Gly	Thr	Leu	Leu	Ala	Gly	Thr	Thr	Val	Ala	Ala	Ala	Ala	Pro	1090	1095	1100	
Gly	Ala	Ala	Asp	Thr	Ala	Asn	Val	Gln	Tyr	Thr	Ser	Arg	Ala	Ala	Glu	1105	1110	1115	1120
Leu	Val	Ala	Gln	Met	Thr	Leu	Asp	Glu	Lys	Ile	Ser	Phe	Val	His	Trp	1125	1130	1135	
Ala	Leu	Asp	Pro	Asp	Arg	Gln	Asn	Val	Gly	Tyr	Leu	Pro	Gly	Val	Pro	1140	1145	1150	
Arg	Leu	Gly	Ile	Pro	Glu	Leu	Arg	Ala	Ala	Asp	Gly	Pro	Asn	Gly	Ile	1155	1160	1165	
Arg	Leu	Val	Gly	Gln	Thr	Ala	Thr	Ala	Leu	Pro	Ala	Pro	Val	Ala	Leu	1170	1175	1180	
Ala	Ser	Thr	Phe	Asp	Asp	Thr	Met	Ala	Asp	Ser	Tyr	Gly	Lys	Val	Met	1185	1190	1195	1200
Gly	Arg	Asp	Gly	Arg	Ala	Leu	Asn	Gln	Asp	Met	Val	Leu	Gly	Pro	Met	1205	1210	1215	
Met	Asn	Asn	Ile	Arg	Val	Pro	His	Gly	Gly	Arg	Asn	Tyr	Glu	Thr	Phe	1220	1225	1230	
Ser	Glu	Asp	Pro	Leu	Val	Ser	Ser	Arg	Thr	Ala	Val	Ala	Gln	Ile	Lys	1235	1240	1245	
Gly	Ile	Gln	Gly	Ala	Gly	Leu	Met	Thr	Thr	Ala	Lys	His	Phe	Ala	Ala	1250	1255	1260	
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Gln	Thr	Leu	Arg	Glu	Ile	Glu	Phe	Pro	Ala	Phe	Glu	Ala	Ser	Ser	Lys	1285	1290	1295	
Ala	Gly	Ala	Ala	Ser	Phe	Met	Cys	Ala	Tyr	Asn	Gly	Leu	Asn	Gly	Lys	1300	1305	1310	
Pro	Ser	Cys	Gly	Asn	Asp	Glu	Leu	Leu	Asn	Asn	Val	Leu	Arg	Thr	Gln	1315	1320	1325	
Trp	Gly	Phe	Gln	Gly	Trp	Val	Met	Ser	Asp	Trp	Leu	Ala	Thr	Pro	Gly	1330	1335	1340	
Thr	Asp	Ala	Ile	Thr	Lys	Gly	Leu	Asp	Gln	Glu	Met	Gly	Val	Glu	Leu	1345	1350	1355	1360
Pro	Gly	Asp	Val	Pro	Lys	Gly	Glu	Pro	Ser	Pro	Pro	Ala	Lys	Phe	Phe	1365	1370	1375	
Gly	Glu	Ala	Leu	Lys	Thr	Ala	Val	Leu	Asn	Gly	Thr	Val	Pro	Glu	Ala	1380	1385	1390	
Ala	Val	Thr	Arg	Ser	Ala	Glu	Arg	Ile	Val	Gly	Gln	Met	Glu	Lys	Phe	1395	1400	1405	
Gly	Leu	Leu	Ala	Thr	Pro	Ala	Pro	Arg	Pro	Glu	Arg	Asp	Lys	Ala		1410	1415	1420	
Gly	Ala	Gln	Ala	Val	Ser	Arg	Lys	Val	Ala	Glu	Asn	Gly	Ala	Val	Leu	1425	1430	1435	1440

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 Thr Ile Lys Ala Arg Ala Gly Ala Gly Ala Thr Val Thr Tyr Glu Thr  
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<212> PRT

<213> Streptomyces venezuelae

<400> 6

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Thr	Lys	Gly	Pro	Ile	Leu	Glu	Ile	Gly	Pro	Gly	Asp	Gly	Ala	Leu	Thr
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Leu	Pro	Leu	Ser	Arg	His	Gly	Arg	Pro	Ile	Thr	Ala	Val	Glu	Leu	Asp
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Trp	Glu	Val	Ala	Arg	Arg	Arg	Ala	Gly	Val	Gly	Gly	Ser	Thr	Leu	Leu
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Thr	Ala	Gly	Trp	Ala	Pro	Trp	Tyr	Glu	Phe	Asp	Leu	His	Ser	Arg	Val
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Pro	Ala	Arg	Ala	Phe	Arg	Pro	Met	Pro	Gly	Val	Asp	Gly	Gly	Val	Leu
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Ala	Ile	Arg	Arg	Arg	Ser	Ala	Pro	Leu	Val	Gly	Gln	Val	Lys	Thr	Tyr
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Phe	Asp	Thr	Val	Thr	Val	Val	Glu	Met	Asp	Pro	His	Trp	Ala	Ala	His
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Val	Arg	Arg	Lys	Phe	Glu	Gly	Glu	Arg	Val	Thr	Val	Phe	Gln	Gly	Asp
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Phe	Leu	Asp	Phe	Arg	Ile	Pro	Arg	Asp	Ile	Asp	Thr	Val	Val	Gly	Asn
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Val	Pro	Phe	Gly	Ile	Thr	Thr	Gln	Ile	Leu	Arg	Ser	Leu	Leu	Glu	Ser
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Pro	Trp	Tyr	Glu	Phe	Ala	Val	His	Asp	Arg	Val	Arg	Ala	Ser	Ser	Phe
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Ala	Glu	Ala	Val	Phe	Thr	Gly	Pro	Gly	Arg	Gly	Leu	Ala	Glu	Ile	Leu
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Gly	Ile	Pro	Asp	Gly	Gly	Leu	Pro	Lys	Asp	Leu	Thr	Leu	Thr	Gln	Trp
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Thr	Lys	Gly	Arg	Gln	Gly	Ala	Arg	Gly	Ser	Ser	Tyr	Gly	Arg	Arg	Thr
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 1825 1830 1835 1840  
 Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln  
 1845 1850 1855  
 Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly  
 1860 1865 1870



Ile Asp Pro Thr Ser Leu Arg Gly Arg Gln Val Gly Val Phe Thr Gly  
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Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp Gly  
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Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala  
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Ile Glu Thr Leu Ala Val Asp Glu Gly Phe Thr His Phe Val Glu Val  
2565 2570 2575  
Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly  
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2595 2600 2605  
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Glu Asp Gln Ile Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu  
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His Gly Thr Val Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His  
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 Pro Tyr Gly Ile His Pro Ala Leu Leu Asp Ala Ser Leu His Ala Ile  
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 Glu Leu Lys Val Ala Ala Ala Leu Glu Ser Ala Gly Val Glu Val Gly  
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 Leu Tyr Pro Asp Leu Ala Ala Leu Ser Gln Asp Val Ala Ala Gly Ala  
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Thr Ser Pro Ala Gln Ala Met Val Trp Gly Met Gly Arg Val Ala Ala  
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 Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu  
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Lys Glu Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His  
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Val Pro Phe Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val  
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 Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu  
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 His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val  
 11285 11290 11295

Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala  
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 Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser  
 11315 11320 11325  
 Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp Val Leu Ala Gly  
 11330 11335 11340  
 Leu Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly  
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 Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu  
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 Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala Thr Leu Arg Arg  
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 Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu Pro Ala Thr Gly  
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 Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly Leu Ala Trp Gly  
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 Pro Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu Leu Ala Gly Gly  
 11665 11670 11675 11680  
 Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val Gly Cys Thr Gly  
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 Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu Pro Gly Tyr Gly  
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 11780 11785 11790

Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu Pro Ile Glu Val  
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 Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly Glu Leu Glu Pro  
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 Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg Ser Asp  
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 Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp His Glu  
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 Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly Ala Pro  
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<210> 7

<211> 1248

<212> DNA

<213> *Streptomyces venezuelae*

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60  
120

gccctcgaca	gccagtggct	gtccaacggc	ggcccgctcg	tccgcgagtt	cgaggagcgc	180
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cagctcctcg	cgcacgccgc	cggcctcacc	ggcgaagtga	tcatgccgtc	gatgacgttc	300
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ccggacaccg	gcaacctcga	cccggaccag	gtggccgccc	cggtcacacc	ccgcacctcg	420
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gccgtcaacg	ccttcgaggg	cggcgccgtc	gtcaccgacg	acgccgacct	cgccgcccgg	660
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aacgccaaga	tgagcgaggc	cggcgccgcc	atgggcctca	cctccctcga	cgcgtttccc	780
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gtcgagatcg	acgaggccac	caccggcatc	caccgcgacc	tcgtcatgga	ggtcctgaag	960
gccgaaggcg	tgcacacccg	cgcctacttc	tcgcccgggt	gccacgagct	ggagccgtac	1020
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ctgccgaccg	gcaccgccat	cggcgacgac	gacatccgcc	gggtcgccga	cctgctgcgt	1140
ctctgcgcga	cccgcggccg	cgaactgacc	gcgcgccacc	gcgacacggc	ccccgccccg	1200
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<210> 8

<211> 415

<212> PRT

<213> Streptomyces venezuelae

<400> 8

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Arg	Leu	Tyr	Glu	Arg	Leu	Asp	Arg	Ala	Leu	Asp	Ser	Gln	Trp	Leu	Ser
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Asn	Gly	Gly	Pro	Leu	Val	Arg	Glu	Phe	Glu	Glu	Arg	Val	Ala	Gly	Leu
	50					55					60				
Ala	Gly	Val	Arg	His	Ala	Val	Ala	Thr	Cys	Asn	Ala	Thr	Ala	Gly	Leu
65				70					75					80	
Gln	Leu	Leu	Ala	His	Ala	Ala	Gly	Leu	Thr	Gly	Glu	Val	Ile	Met	Pro
				85				90						95	
Ser	Met	Thr	Phe	Ala	Ala	Thr	Pro	His	Ala	Leu	Arg	Trp	Ile	Gly	Leu
			100					105					110		
Thr	Pro	Val	Phe	Ala	Asp	Ile	Asp	Pro	Asp	Thr	Gly	Asn	Leu	Asp	Pro
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Asp	Gln	Val	Ala	Ala	Ala	Val	Thr	Pro	Arg	Thr	Ser	Ala	Val	Val	Gly
	130					135					140				
Val	His	Leu	Trp	Gly	Arg	Pro	Cys	Ala	Ala	Asp	Gln	Leu	Arg	Lys	Val
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Ala	Asp	Glu	His	Gly	Leu	Arg	Leu	Tyr	Phe	Asp	Ala	Ala	His	Ala	Leu
			165					170					175		
Gly	Cys	Ala	Val	Asp	Gly	Arg	Pro	Ala	Gly	Ser	Leu	Gly	Asp	Ala	Glu
			180					185					190		
Val	Phe	Ser	Phe	His	Ala	Thr	Lys	Ala	Val	Asn	Ala	Phe	Glu	Gly	Gly
		195					200					205			
Ala	Val	Val	Thr	Asp	Asp	Ala	Asp	Leu	Ala	Ala	Arg	Ile	Arg	Ala	Leu
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His	Asn	Phe	Gly	Phe	Asp	Leu	Pro	Gly	Gly	Ser	Pro	Ala	Gly	Gly	Thr
225				230						235				240	
Asn	Ala	Lys	Met	Ser	Glu	Ala	Ala	Ala	Ala	Met	Gly	Leu	Thr	Ser	Leu
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Asp	Ala	Phe	Pro	Glu	Val	Ile	Asp	Arg	Asn	Arg	Arg	Asn	His	Ala	Ala
			260				265					270			
Tyr	Arg	Glu	His	Leu	Ala	Asp	Leu	Pro	Gly	Val	Leu	Val	Ala	Asp	His
		275					280					285			

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Glu	Ala	Thr	Thr	Gly	Ile	His	Arg	Asp	Leu	Val	Met	Glu	Val	Leu	Lys
305				310					315						320
Ala	Glu	Gly	Val	His	Thr	Arg	Ala	Tyr	Phe	Ser	Pro	Gly	Cys	His	Glu
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Leu	Glu	Pro	Tyr	Arg	Gly	Gln	Pro	His	Ala	Pro	Leu	Pro	His	Thr	Glu
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Arg	Leu	Ala	Ala	Arg	Val	Leu	Ser	Leu	Pro	Thr	Gly	Thr	Ala	Ile	Gly
	355					360					365				
Asp	Asp	Asp	Ile	Arg	Arg	Val	Ala	Asp	Leu	Leu	Arg	Leu	Cys	Ala	Thr
370					375				380						
Arg	Gly	Arg	Glu	Leu	Thr	Ala	Arg	His	Arg	Asp	Thr	Ala	Pro	Ala	Pro
385				390					395						400
Leu	Ala	Ala	Pro	Gln	Thr	Ser	Thr	Pro	Thr	Ile	Gly	Arg	Ser	Arg	
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<210> 9

<211> 1458

<212> DNA

<213> Streptomyces venezuelae

<400> 9

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cccgcagagg	ccggaacgac	cgcccgccac	ctcgtccggc	tcgccgtgcg	ctacggcaac	180
agccccctca	ccccgctgga	ggaggcccgc	cacgacctgg	gcgtcgaccg	ggacgccttc	240
cggcgccctcc	tcgccttggt	cgggcaggtc	ccggagctcc	gcaccgcggt	cgagaccggc	300
cccgcggggg	cgtactggaa	gaacaccctg	ctcccgtctg	aacagcgcgg	cgtcttcgac	360
gcggcgctcg	ccaggaagcc	cgtcttcccg	tacagcgtcg	gcctctaccc	cggcccagcc	420
tgcattgtcc	gctgccactt	ctgcgtccgt	gtgaccggcg	cccgtctacg	cccgtccgcc	480
ctcgacgcgc	gcaacgccat	gttccgggtc	gtcatcgacg	agatacccgc	gggcaacccc	540
tcggcgatgt	actttctccg	cggcctggag	ccgctcacca	accccggcct	cgggagcctg	600
gccgcgcacg	ccaccgacca	cggcctgcgg	cccaccgtct	acacgaactc	cttcgcgctc	660
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cgcgaggact	acagcggccg	tgacgacggc	aagctgccgc	aggaggagcg	ggccgagctc	1020
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gactacggct	acgccttgaa	cagcctgcgc	accggggccg	acgccgaact	gctgcggatc	1140
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ggcgacgtgt	acctgtaccg	cgaggccggc	ttccccgacc	tggacggcgc	gacccgctac	1260
atcgcggggc	gcgtgacccc	cgacacctcc	ctcaccgagg	tcgtcaggga	cttcgctcag	1320
cgcggcggcg	aggtggcggc	cgtcgacggc	gacgagta	tcattggacg	cttcgatcag	1380
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<210> 10

<211> 485

<212> PRT

<213> Streptomyces venezuelae

<400> 10

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		20					25					30			
Leu	Ala	Ala	Gly	Gly	Leu	Val	Pro	Pro	Asp	Glu	Ala	Gly	Thr	Thr	Ala
	35						40					45			

Arg	His	Leu	Val	Arg	Leu	Ala	Val	Arg	Tyr	Gly	Asn	Ser	Pro	Phe	Thr
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Pro	Leu	Glu	Glu	Ala	Arg	His	Asp	Leu	Gly	Val	Asp	Arg	Asp	Ala	Phe
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Arg	Arg	Leu	Leu	Ala	Leu	Phe	Gly	Gln	Val	Pro	Glu	Leu	Arg	Thr	Ala
				85					90					95	
Val	Glu	Thr	Gly	Pro	Ala	Gly	Ala	Tyr	Trp	Lys	Asn	Thr	Leu	Leu	Pro
			100					105					110		
Leu	Glu	Gln	Arg	Gly	Val	Phe	Asp	Ala	Ala	Leu	Ala	Arg	Lys	Pro	Val
		115					120					125			
Phe	Pro	Tyr	Ser	Val	Gly	Leu	Tyr	Pro	Gly	Pro	Thr	Cys	Met	Phe	Arg
130						135					140				
Cys	His	Phe	Cys	Val	Arg	Val	Thr	Gly	Ala	Arg	Tyr	Asp	Pro	Ser	Ala
145					150					155					160
Leu	Asp	Ala	Gly	Asn	Ala	Met	Phe	Arg	Ser	Val	Ile	Asp	Glu	Ile	Pro
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Ala	Gly	Asn	Pro	Ser	Ala	Met	Tyr	Phe	Ser	Gly	Gly	Leu	Glu	Pro	Leu
			180						185				190		
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				245					250					255	
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			260					265					270		
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	290					295					300				
Asp	Leu	Asn	Asp	Ala	Gly	Gln	Gly	Arg	Thr	Ile	Asp	Phe	Val	Asn	Ile
305					310					315					320
Arg	Glu	Asp	Tyr	Ser	Gly	Arg	Asp	Asp	Gly	Lys	Leu	Pro	Gln	Glu	Glu
				325					330					335	
Arg	Ala	Glu	Leu	Gln	Glu	Ala	Leu	Asn	Ala	Phe	Glu	Glu	Arg	Val	Arg
			340					345					350		
Glu	Arg	Thr	Pro	Gly	Leu	His	Ile	Asp	Tyr	Gly	Tyr	Ala	Leu	Asn	Ser
		355				360						365			
Leu	Arg	Thr	Gly	Ala	Asp	Ala	Glu	Leu	Leu	Arg	Ile	Lys	Pro	Ala	Thr
	370					375					380				
Met	Arg	Pro	Thr	Ala	His	Pro	Gln	Val	Ala	Val	Gln	Val	Asp	Leu	Leu
385					390					395					400
Gly	Asp	Val	Tyr	Leu	Tyr	Arg	Glu	Ala	Gly	Phe	Pro	Asp	Leu	Asp	Gly
				405					410					415	
Ala	Thr	Arg	Tyr	Ile	Ala	Gly	Arg	Val	Thr	Pro	Asp	Thr	Ser	Leu	Thr
			420					425					430		
Glu	Val	Val	Arg	Asp	Phe	Val	Glu	Arg	Gly	Gly	Glu	Val	Ala	Ala	Val
		435					440					445			
Asp	Gly	Asp	Glu	Tyr	Phe	Met	Asp	Gly	Phe	Asp	Gln	Val	Val	Thr	Ala
	450					455					460				
Arg	Leu	Asn	Gln	Leu	Glu	Arg	Asp	Ala	Ala	Asp	Gly	Trp	Glu	Glu	Ala
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Arg	Gly	Phe	Leu	Arg											
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<210> 11

<211> 879

<212> DNA

<213> Streptomyces venezuelae



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ctcatgctcg gcggtattcg cgagattcaa atcatctcga cccccagca catcgaactc      180
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aaagagcccc caggaatcgc ggacgcactt ctgctcggag ccgagcacat cggcgacgac      300
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atcgacgccg aggcctgtca cggcctggga gaaggcctct cccgcaccga gtacggcagc      840
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<210> 12
<211> 292
<212> PRT
<213> Streptomyces venezuelae

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Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Gly Gly Ile Arg Glu
35     40     45
Ile Gln Ile Ile Ser Thr Pro Gln His Ile Glu Leu Phe Gln Ser Leu
50     55     60
Leu Gly Asn Gly Arg His Leu Gly Ile Glu Leu Asp Tyr Ala Val Gln
65     70     75     80
Lys Glu Pro Ala Gly Ile Ala Asp Ala Leu Leu Val Gly Ala Glu His
85     90     95
Ile Gly Asp Asp Thr Cys Ala Leu Ile Leu Gly Asp Asn Ile Phe His
100    105    110
Gly Pro Gly Leu Tyr Thr Leu Leu Arg Asp Ser Ile Ala Arg Leu Asp
115    120    125
Gly Cys Val Leu Phe Gly Tyr Pro Val Lys Asp Pro Glu Arg Tyr Gly
130    135    140
Val Ala Glu Val Asp Ala Thr Gly Arg Leu Thr Asp Leu Val Glu Lys
145    150    155    160
Pro Val Lys Pro Arg Ser Asn Leu Ala Val Thr Gly Leu Tyr Leu Tyr
165    170    175
Asp Asn Asp Val Val Asp Ile Ala Lys Asn Ile Arg Pro Ser Pro Arg
180    185    190
Gly Glu Leu Glu Ile Thr Asp Val Asn Arg Val Tyr Leu Glu Arg Gly
195    200    205
Arg Ala Glu Leu Val Asn Leu Gly Arg Gly Phe Ala Trp Leu Asp Thr
210    215    220
Gly Thr His Asp Ser Leu Leu Arg Ala Ala Gln Tyr Val Gln Val Leu
225    230    235    240
Glu Glu Arg Gln Gly Val Trp Ile Ala Gly Leu Glu Glu Ile Ala Phe
245    250    255
Arg Met Gly Phe Ile Asp Ala Glu Ala Cys His Gly Leu Gly Glu Gly
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290

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 <212> DNA  
 <213> Streptomyces venezuelae

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 tacgcgggca accgcgcaa cctcgcccc gtggacgcgg acccgcgact gcgcttcgtc 180  
 cacggcgaca tccgcgacgc cggcctcctc gcccggaac tgcgcggcgt ggacgccatc 240  
 gtccacttcg cggccgagag ccacgtggac cgctccatcg cgggcgcgtc cgtgttcacc 300  
 gagaccaacg tgcagggcac gcagacgctg ctccagtgcg ccgtcgacgc cggcgctcggc 360  
 cgggtcgtgc acgtctccac cgacgaggtg tacgggtcga tcgactccgg ctccctggacc 420  
 gagagcagcc cgctggagcc caactcgccc tacgcggcgt ccaaggccgg ctccgacctc 480  
 gttgcccgcg cctaccaccg gacgtacggc ctcgacgtac ggatcaccgc ctgctgcaac 540  
 aactacgggc cgtaccagca ccccgagaag ctcatccccc tcttcgtgac gaacctcctc 600  
 gacggcgga cgctcccgt gtacggcgac ggcgcgaacg tccgcgagtg ggtgcacacc 660  
 gacgaccact gccggggcat cgcgctcgtc ctgcggggcg gccgggcccg cgagatctac 720  
 cacatcggcg cgggcctgga gctgaccaac cgcgaactca ccggcatcct cctggactcg 780  
 ctgcggcgcc actggctcctc ggtccggaag gtcgcccgaacc gcaagggcca cgacctgcgc 840  
 tactccctcg acggcggcga gatcgagcgc gagctcggt accgcccga ggtctccttc 900  
 gcggacggcc tcgcgcggac cgtccgctgg taccgggaga acccgggctg gtgggagccg 960  
 ctcaaggcga ccgccccga gctgcccgc accgcgctgg aggtgtccgc gtga 1014

<210> 14  
 <211> 337  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 14  
 Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe  
 1 5 10 15  
 Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Val Pro Ala Asp Glu  
 20 25 30  
 Val Ile Val Leu Asp Ser Leu Thr Tyr Ala Gly Asn Arg Ala Asn Leu  
 35 40 45  
 Ala Pro Val Asp Ala Asp Pro Arg Leu Arg Phe Val His Gly Asp Ile  
 50 55 60  
 Arg Asp Ala Gly Leu Leu Ala Arg Glu Leu Arg Gly Val Asp Ala Ile  
 65 70 75 80  
 Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Gly Ala  
 85 90 95  
 Ser Val Phe Thr Glu Thr Asn Val Gln Gly Thr Gln Thr Leu Leu Gln  
 100 105 110  
 Cys Ala Val Asp Ala Gly Val Gly Arg Val Val His Val Ser Thr Asp  
 115 120 125  
 Glu Val Tyr Gly Ser Ile Asp Ser Gly Ser Trp Thr Glu Ser Ser Pro  
 130 135 140  
 Leu Glu Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu  
 145 150 155 160  
 Val Ala Arg Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Ile Thr  
 165 170 175  
 Arg Cys Cys Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Leu Ile  
 180 185 190  
 Pro Leu Phe Val Thr Asn Leu Leu Asp Gly Gly Thr Leu Pro Leu Tyr  
 195 200 205  
 Gly Asp Gly Ala Asn Val Arg Glu Trp Val His Thr Asp Asp His Cys  
 210 215 220  
 Arg Gly Ile Ala Leu Val Leu Ala Gly Gly Arg Ala Gly Glu Ile Tyr  
 225 230 235 240  
 His Ile Gly Gly Gly Leu Glu Leu Thr Asn Arg Glu Leu Thr Gly Ile  
 245 250 255

Leu Leu Asp Ser Leu Gly Ala Asp Trp Ser Ser Val Arg Lys Val Ala  
                   260                  265                  270  
 Asp Arg Lys Gly His Asp Leu Arg Tyr Ser Leu Asp Gly Gly Glu Ile  
                   275                  280                  285  
 Glu Arg Glu Leu Gly Tyr Arg Pro Gln Val Ser Phe Ala Asp Gly Leu  
                   290                  295                  300  
 Ala Arg Thr Val Arg Trp Tyr Arg Glu Asn Arg Gly Trp Trp Glu Pro  
 305                  310                  315                  320  
 Leu Lys Ala Thr Ala Pro Gln Leu Pro Ala Thr Ala Val Glu Val Ser  
                   325                  330                  335  
 Ala

<210> 15  
 <211> 1140  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 15  
 gtgagcagcc gcgcccagac cccccgcgtc cccttcctcg acctcaaggc cgcctacgag 60  
 gagctccgcg cggagaccga cgccgcgata gcccgcgtcc tcgactcggg gcgctacctc 120  
 ctcggaccgg aactcgaagg attcgaggcg gagttcgccg cgtactgcga gacggaccac 180  
 gccgtcggcg tgaacagcgg gatggacgcc ctccagctcg ccctccgcgg cctcggcatc 240  
 ggacccgggg acgaggtgat cgtccccctc cacacgtaca tcgccagctg gctcgcggtg 300  
 tccgccaccg gcgcgacccc cgtgcccgtc gagccgcacg aggaccaccc caccctggac 360  
 ccgctgctcg tcgagaaggc gatcaccccc cgcacccggg cgctcctccc cgtccacctc 420  
 tacggggcacc ccgccgacat ggacgccttc cgcgagctcg cggaccggca cggcctgcac 480  
 atcgctcgagg acgcccgcga ggcacacggc gcccgcctacc ggggcccggc gatcggcgcc 540  
 gggctcgtcg tggccgcggt cagcttctac ccgggcaaga acctcggctg cttcggcgac 600  
 gggcgccgcc tcgtcaccgg cgaccccag ctcgccgaac ggctccggat gctccgcaac 660  
 tacggctcgc ggcagaagta cagccacgag acgaagggca ccaactccc cctggacgag 720  
 atgcaggccg ccgtgctgcg gatccggctc gcccacctgg acagctggaa cggccgcagg 780  
 tcggcgctgg ccgcggagta cctctccggg ctcgccggac tgcccggcat cggcctgccg 840  
 gtgaccgcgc ccgacaccga cccggtctgg cacctcttca ccgtgcgcac cgagcgccgc 900  
 gacgagctgc gcagccacct cgacgcccgc ggcacgcaga ccctcacgca ctaccgggta 960  
 cccgtgcacc tctcggccgc ctacgcgggc gaggcaccgc cgggaaggctc gctcccgcgg 1020  
 gccgagagct tcgcgcggca ggtcctcagc ctgccgatcg gcccgcacct ggagcgcccg 1080  
 caggcgctgc ggggtgatcg cgccgtgcgc gaatggggcg agcgggtcga ccaggcctag 1140

<210> 16  
 <211> 379  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 16  
 Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp Leu Lys  
   1                  5                  10                  15  
 Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile Ala Arg  
                   20                  25                  30  
 Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Glu Gly Phe  
                   35                  40                  45  
 Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val Gly Val  
                   50                  55                  60  
 Asn Ser Gly Met Asp Ala Leu Gln Leu Ala Leu Arg Gly Leu Gly Ile  
 65                  70                  75                  80  
 Gly Pro Gly Asp Glu Val Ile Val Pro Ser His Thr Tyr Ile Ala Ser  
                   85                  90                  95  
 Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val Glu Pro  
                   100                  105                  110  
 His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys Ala Ile  
                   115                  120                  125

Thr	Pro	Arg	Thr	Arg	Ala	Leu	Leu	Pro	Val	His	Leu	Tyr	Gly	His	Pro
130						135					140				
Ala	Asp	Met	Asp	Ala	Leu	Arg	Glu	Leu	Ala	Asp	Arg	His	Gly	Leu	His
145					150					155					160
Ile	Val	Glu	Asp	Ala	Ala	Gln	Ala	His	Gly	Ala	Arg	Tyr	Arg	Gly	Arg
				165					170					175	
Arg	Ile	Gly	Ala	Gly	Ser	Ser	Val	Ala	Ala	Phe	Ser	Phe	Tyr	Pro	Gly
			180					185					190		
Lys	Asn	Leu	Gly	Cys	Phe	Gly	Asp	Gly	Gly	Ala	Val	Val	Thr	Gly	Asp
	195					200						205			
Pro	Glu	Leu	Ala	Glu	Arg	Leu	Arg	Met	Leu	Arg	Asn	Tyr	Gly	Ser	Arg
	210					215					220				
Gln	Lys	Tyr	Ser	His	Glu	Thr	Lys	Gly	Thr	Asn	Ser	Arg	Leu	Asp	Glu
225					230					235					240
Met	Gln	Ala	Ala	Val	Leu	Arg	Ile	Arg	Leu	Ala	His	Leu	Asp	Ser	Trp
				245					250					255	
Asn	Gly	Arg	Arg	Ser	Ala	Leu	Ala	Ala	Glu	Tyr	Leu	Ser	Gly	Leu	Ala
			260					265					270		
Gly	Leu	Pro	Gly	Ile	Gly	Leu	Pro	Val	Thr	Ala	Pro	Asp	Thr	Asp	Pro
	275					280						285			
Val	Trp	His	Leu	Phe	Thr	Val	Arg	Thr	Glu	Arg	Arg	Asp	Glu	Leu	Arg
	290					295					300				
Ser	His	Leu	Asp	Ala	Arg	Gly	Ile	Asp	Thr	Leu	Thr	His	Tyr	Pro	Val
305					310					315					320
Pro	Val	His	Leu	Ser	Pro	Ala	Tyr	Ala	Gly	Glu	Ala	Pro	Pro	Glu	Gly
				325					330					335	
Ser	Leu	Pro	Arg	Ala	Glu	Ser	Phe	Ala	Arg	Gln	Val	Leu	Ser	Leu	Pro
			340					345					350		
Ile	Gly	Pro	His	Leu	Glu	Arg	Pro	Gln	Ala	Leu	Arg	Val	Ile	Asp	Ala
		355				360						365			
Val	Arg	Glu	Trp	Ala	Glu	Arg	Val	Asp	Gln	Ala					
	370					375									

<210> 17  
 <211> 714  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 17	
gtgtacgaag tgcaccacgc cgacgtctac gacctcttct acctgggtcg cggcaaggac	60
tacgccgccg aggcctccga catcgccgac ctggtgcgct cccgtacccc cgaggcctcc	120
tcgctccttg acgtggcctg cggtaagggc acgcattctg agcacttcac caaggagttc	180
ggcgacaccg ccggcctgga gctgtccgag gacatgtctc cccacgcccg caagcggtcg	240
cccgacgcca cgctccacca gggcgacatg cgggacttcc ggctcggccg gaagttctcc	300
gccgtgggtca gcatgttcag ctccgtcggc tacctgaaga cgaccgagga actcggcgcg	360
gccgtcgctt cgttcgcgga gcacctggag cccggtggcg tcgtcgtcgt cgagccgtgg	420
tggttcccgg agaccttcgc cgacggctgg gtcagcgccg acgtcgtccg ccgtgacggg	480
cgcaccgtgg cccgtgtctc gactcggtg cgggagggga acgacgacgc catggaggtc	540
cacttcaccg tggccgaccc gggcaagggc gtgcggcact tctccgacgt ccattctcgc	600
acctgtttcc accaggccga gtacgaggcc gcgttcacgg ccgccgggct gcgcgtcgag	660
tacctggagg gcggcccgtc gggccgtggc ctcttcgtcg gcgtccccgc ctga	714

<210> 18  
 <211> 237  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 18	
Met Tyr Glu Val Asp His Ala Asp Val Tyr Asp Leu Phe Tyr Leu Gly	
1 5 10 15	
Arg Gly Lys Asp Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val	
20 25 30	

Arg	Ser	Arg	Thr	Pro	Glu	Ala	Ser	Ser	Leu	Leu	Asp	Val	Ala	Cys	Gly
	35						40					45			
Thr	Gly	Thr	His	Leu	Glu	His	Phe	Thr	Lys	Glu	Phe	Gly	Asp	Thr	Ala
	50					55					60				
Gly	Leu	Glu	Leu	Ser	Glu	Asp	Met	Leu	Thr	His	Ala	Arg	Lys	Arg	Leu
65					70				75						80
Pro	Asp	Ala	Thr	Leu	His	Gln	Gly	Asp	Met	Arg	Asp	Phe	Arg	Leu	Gly
			85					90					95		
Arg	Lys	Phe	Ser	Ala	Val	Val	Ser	Met	Phe	Ser	Ser	Val	Gly	Tyr	Leu
			100					105					110		
Lys	Thr	Thr	Glu	Glu	Leu	Gly	Ala	Ala	Val	Ala	Ser	Phe	Ala	Glu	His
		115				120						125			
Leu	Glu	Pro	Gly	Gly	Val	Val	Val	Val	Glu	Pro	Trp	Trp	Phe	Pro	Glu
	130					135					140				
Thr	Phe	Ala	Asp	Gly	Trp	Val	Ser	Ala	Asp	Val	Val	Arg	Arg	Asp	Gly
145					150				155						160
Arg	Thr	Val	Ala	Arg	Val	Ser	His	Ser	Val	Arg	Glu	Gly	Asn	Ala	Thr
			165					170						175	
Arg	Met	Glu	Val	His	Phe	Thr	Val	Ala	Asp	Pro	Gly	Lys	Gly	Val	Arg
		180						185					190		
His	Phe	Ser	Asp	Val	His	Leu	Ile	Thr	Leu	Phe	His	Gln	Ala	Glu	Tyr
		195					200					205			
Glu	Ala	Ala	Phe	Thr	Ala	Ala	Gly	Leu	Arg	Val	Glu	Tyr	Leu	Glu	Gly
	210					215					220				
Gly	Pro	Ser	Gly	Arg	Gly	Leu	Phe	Val	Gly	Val	Pro	Ala			
225					230						235				

<210> 19

<211> 1281

<212> DNA

<213> Streptomyces venezuelae

<400> 19

atgcgcgtcc	tgctgacctc	gttcgcacat	cacacgcact	actacggcct	ggtgcccctg	60
gctggggcgc	tgctgcgcgc	cgggcacgag	gtgcccgtcg	ccagccagcc	cgcgctcacg	120
gacaccatca	ccgggtccgc	gctgcgcgcg	gtgcccgtcg	gcaccgacca	cctcatccac	180
gagtagccgg	tgccgatggc	gggcgagccg	cgcgcgaacc	atccggcgat	cgccttcgac	240
gaggcccgtc	ccgagccgct	ggactgggac	cacgcctctg	gcacgcaggg	gatcctcgcc	300
ccgtacttcc	atctgctcgc	caacaacgac	tcgatggctg	acgacctcgt	cgacttcgcc	360
cggctcctgg	agccggacct	ggtgctgtgg	gagccgacga	cctacgcggg	cgccgtcgcc	420
gcccagggtca	ccggtgcgcg	gcacgcccgc	gtcctgtggg	ggcccgcagt	gatgggcagc	480
gcccgcgcga	agttcgtcgc	gctgcgggac	cggcagccgc	ccgagcaccg	cgaggacccc	540
accgcggagt	ggctgacgtg	gacgctcgac	cggtagcggc	cctccttcga	agaggagctg	600
ctcaccggcc	agttcacgat	cgacccgacc	ccgccgagcc	tgcccttcga	cacgggcctg	660
ccgaccgtcg	ggatgcgtta	tgttccgtac	aacggcacgt	cggctcgtgc	ggactggctg	720
agtgcgcgcg	ccgcgcggcc	ccgggtctgc	ctgacctcgc	gcgtctccgc	gcgtgaggtc	780
ctcggcgggc	acggcgtctc	gcagggcgac	atcctggagg	cgctcgccga	cctcgacatc	840
gagctcgtcg	ccacgctcga	cgcgagtcag	cgcgcgcaga	tccgcaacta	cccgaagcac	900
acccggttca	cggacttcgt	gccgatgcac	gcgctcctgc	cgagctgctc	ggcgatcatc	960
caccacggcg	gggcgggcac	ctacgcgacc	gccgtgatca	acgcgggtgc	gcaggtcatg	1020
ctcgcgcgag	tgtgggacgc	gccggtcaag	gcgcggggcg	tcgccgagca	ggggggcggg	1080
ttcttccctg	cgcgcggcca	gtcacgcgcg	caggccgtgc	gggacgccgt	cgtccgcac	1140
ctcgacgacc	cctcggtcgc	caccgcgcgc	caccggctgc	gcgaggagac	cttcggcgac	1200
cccaccccg	ccgggatcgt	ccccgagctg	gagcggctcg	ccgcgcagca	ccgccgcccc	1260
ccggccgacg	cccggcactg	a				1281

<210> 20

<211> 426

<212> PRT

<213> Streptomyces venezuelae

<400> 20  
Met Arg Val Leu Leu Thr Ser Phe Ala His His Thr His Tyr Tyr Gly  
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Leu Val Pro Leu Ala Trp Ala Leu Leu Ala Ala Gly His Glu Val Arg  
20 25 30  
Val Ala Ser Gln Pro Ala Leu Thr Asp Thr Ile Thr Gly Ser Gly Leu  
35 40 45  
Ala Ala Val Pro Val Gly Thr Asp His Leu Ile His Glu Tyr Arg Val  
50 55 60  
Arg Met Ala Gly Glu Pro Arg Pro Asn His Pro Ala Ile Ala Phe Asp  
65 70 75 80  
Glu Ala Arg Pro Glu Pro Leu Asp Trp Asp His Ala Leu Gly Ile Glu  
85 90 95  
Ala Ile Leu Ala Pro Tyr Phe His Leu Leu Ala Asn Asn Asp Ser Met  
100 105 110  
Val Asp Asp Leu Val Asp Phe Ala Arg Ser Trp Gln Pro Asp Leu Val  
115 120 125  
Leu Trp Glu Pro Thr Thr Tyr Ala Gly Ala Val Ala Ala Gln Val Thr  
130 135 140  
Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Met Gly Ser  
145 150 155 160  
Ala Arg Arg Lys Phe Val Ala Leu Arg Asp Arg Gln Pro Pro Glu His  
165 170 175  
Arg Glu Asp Pro Thr Ala Glu Trp Leu Thr Trp Thr Leu Asp Arg Tyr  
180 185 190  
Gly Ala Ser Phe Glu Glu Glu Leu Leu Thr Gly Gln Phe Thr Ile Asp  
195 200 205  
Pro Thr Pro Pro Ser Leu Arg Leu Asp Thr Gly Leu Pro Thr Val Gly  
210 215 220  
Met Arg Tyr Val Pro Tyr Asn Gly Thr Ser Val Val Pro Asp Trp Leu  
225 230 235 240  
Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Leu Thr Leu Gly Val Ser  
245 250 255  
Ala Arg Glu Val Leu Gly Gly Asp Gly Val Ser Gln Gly Asp Ile Leu  
260 265 270  
Glu Ala Leu Ala Asp Leu Asp Ile Glu Leu Val Ala Thr Leu Asp Ala  
275 280 285  
Ser Gln Arg Ala Glu Ile Arg Asn Tyr Pro Lys His Thr Arg Phe Thr  
290 295 300  
Asp Phe Val Pro Met His Ala Leu Leu Pro Ser Cys Ser Ala Ile Ile  
305 310 315 320  
His His Gly Gly Ala Gly Thr Tyr Ala Thr Ala Val Ile Asn Ala Val  
325 330 335  
Pro Gln Val Met Leu Ala Glu Leu Trp Asp Ala Pro Val Lys Ala Arg  
340 345 350  
Ala Val Ala Glu Gln Gly Ala Gly Phe Phe Leu Pro Pro Ala Glu Leu  
355 360 365  
Thr Pro Gln Ala Val Arg Asp Ala Val Val Arg Ile Leu Asp Asp Pro  
370 375 380  
Ser Val Ala Thr Ala Ala His Arg Leu Arg Glu Glu Thr Phe Gly Asp  
385 390 395 400  
Pro Thr Pro Ala Gly Ile Val Pro Glu Leu Glu Arg Leu Ala Ala Gln  
405 410 415  
His Arg Arg Pro Pro Ala Asp Ala Arg His  
420 425

<210> 21  
<211> 1209  
<212> DNA  
<213> *Streptomyces venezuelae*

<400> 21  
gtgaccgacg acctgacggg ggccctcacg cagccccgcg tgggcccgcac cgtccgcgcg 60  
gtggccgacc gtgaactcgg caccacacctc ctggagaccc gcggcatcca ctggatccac 120  
gccgcgaacg gcgacccgta cgcacacgtg ctgcgcggcc aggcggacga cccgtatccc 180  
gcgtacgagc ggggtgcgtgc ccgcggcgcg ctctccttca gcccgcgagg cagctgggtc 240  
accgccgatc acgccctggc ggcgagcatc ctctgctcga cggacttcgg ggtctccggc 300  
gccgacggcg tcccgggtgcc gcagcaggtc ctctcgtagc gggagggctg tccgctggag 360  
cgcgagcagg tgctgccggc ggccgggtgac gtgccggagg gcgggcagcg tgccgtggtc 420  
gaggggatcc accgggagac gctggagggt ctgcgcggcg acccgtcggc gtcgtacgcc 480  
ttcgagctgc tgggcgggtt cgtccgcccg gcggtgacgg ccgctgccgc cgcctgctg 540  
gggtgttccc cggaccggcg cgcggacttc gcggatctgc tggagcggct ccggccgctg 600  
tccgacagcc tgctggcccc gcagtccctg cggacggtag gggcggcgga cggcgcgctg 660  
gccgagctca cggcgctgct cgcgattcgc gacgactccc ccggggccct gctgtcggcg 720  
ctcgggggtca ccgcagccgt ccagctcacc gggaacgcgg tgctcgcgt cctcgcgcat 780  
cccgagcagt ggcgggagct gtgcgaccgg cccgggctcg cggcgccgc ggtggaggag 840  
accctccgct acgacccgcc ggtgcagctc gacgcccggg tgggtccgcgg ggagacggag 900  
ctggcggggc ggccggctgcc ggccggggcg catgtcgtcg tctgaccgc cgcgaccggc 960  
cgggaccggg aggtcttcac ggaccggag cgcttcgacc tcgcgcgcc cgacgccgc 1020  
gcgcacctcg cgctgcaccc cgcgggtccg tacggcccgg tggcgccct ggtccggctt 1080  
caggcggagg tcgcgtgcg gaccctggcc gggcggttcc ccgggctgcg gcaggcggg 1140  
gacgtgctcc gccccgcgg cgcgcctgtc ggccgcgggc cgctgagcgt cccggtcagg 1200  
agctcctga 1209

<210> 22

<211> 402

<212> PRT

<213> Streptomyces venezuelae

<400> 22

Met	Thr	Asp	Asp	Leu	Thr	Gly	Ala	Leu	Thr	Gln	Pro	Pro	Leu	Gly	Arg
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Thr	Val	Arg	Ala	Val	Ala	Asp	Arg	Glu	Leu	Gly	Thr	His	Leu	Leu	Glu
			20					25					30		
Thr	Arg	Gly	Ile	His	Trp	Ile	His	Ala	Ala	Asn	Gly	Asp	Pro	Tyr	Ala
		35					40					45			
Thr	Val	Leu	Arg	Gly	Gln	Ala	Asp	Asp	Pro	Tyr	Pro	Ala	Tyr	Glu	Arg
	50					55					60				
Val	Arg	Ala	Arg	Gly	Ala	Leu	Ser	Phe	Ser	Pro	Thr	Gly	Ser	Trp	Val
65					70				75					80	
Thr	Ala	Asp	His	Ala	Leu	Ala	Ala	Ser	Ile	Leu	Cys	Ser	Thr	Asp	Phe
			85					90						95	
Gly	Val	Ser	Gly	Ala	Asp	Gly	Val	Pro	Val	Pro	Gln	Gln	Val	Leu	Ser
			100					105					110		
Tyr	Gly	Glu	Gly	Cys	Pro	Leu	Glu	Arg	Glu	Gln	Val	Leu	Pro	Ala	Ala
	115					120					125				
Gly	Asp	Val	Pro	Glu	Gly	Gly	Gln	Arg	Ala	Val	Val	Glu	Gly	Ile	His
	130				135					140					
Arg	Glu	Thr	Leu	Glu	Gly	Leu	Ala	Pro	Asp	Pro	Ser	Ala	Ser	Tyr	Ala
145					150				155					160	
Phe	Glu	Leu	Leu	Gly	Phe	Val	Arg	Pro	Ala	Val	Thr	Ala	Ala	Ala	
			165					170						175	
Ala	Ala	Val	Leu	Gly	Val	Pro	Ala	Asp	Arg	Arg	Ala	Asp	Phe	Ala	Asp
			180					185					190		
Leu	Leu	Glu	Arg	Leu	Arg	Pro	Leu	Ser	Asp	Ser	Leu	Leu	Ala	Pro	Gln
	195					200						205			
Ser	Leu	Arg	Thr	Val	Arg	Ala	Ala	Asp	Gly	Ala	Leu	Ala	Glu	Leu	Thr
	210				215						220				
Ala	Leu	Leu	Ala	Asp	Ser	Asp	Asp	Ser	Pro	Gly	Ala	Leu	Leu	Ser	Ala
225					230					235				240	
Leu	Gly	Val	Thr	Ala	Ala	Val	Gln	Leu	Thr	Gly	Asn	Ala	Val	Leu	Ala
			245					250						255	

Leu	Leu	Ala	His	Pro	Glu	Gln	Trp	Arg	Glu	Leu	Cys	Asp	Arg	Pro	Gly
		260						265					270		
Leu	Ala	Ala	Ala	Ala	Val	Glu	Glu	Thr	Leu	Arg	Tyr	Asp	Pro	Pro	Val
		275						280				285			
Gln	Leu	Asp	Ala	Arg	Val	Val	Arg	Gly	Glu	Thr	Glu	Leu	Ala	Gly	Arg
		290					295				300				
Arg	Leu	Pro	Ala	Gly	Ala	His	Val	Val	Val	Leu	Thr	Ala	Ala	Thr	Gly
305					310					315					320
Arg	Asp	Pro	Glu	Val	Phe	Thr	Asp	Pro	Glu	Arg	Phe	Asp	Leu	Ala	Arg
				325						330					335
Pro	Asp	Ala	Ala	Ala	His	Leu	Ala	Leu	His	Pro	Ala	Gly	Pro	Tyr	Gly
				340					345					350	
Pro	Val	Ala	Ser	Leu	Val	Arg	Leu	Gln	Ala	Glu	Val	Ala	Leu	Arg	Thr
		355					360					365			
Leu	Ala	Gly	Arg	Phe	Pro	Gly	Leu	Arg	Gln	Ala	Gly	Asp	Val	Leu	Arg
370						375					380				
Pro	Arg	Arg	Ala	Pro	Val	Gly	Arg	Gly	Pro	Leu	Ser	Val	Pro	Val	Ser
385					390					395					400
Ser	Ser														

<210> 23  
 <211> 2430  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 23

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agcaccttcg	acgacacccat	ggccgacagc	tacggcaagg	tcatggggcg	cgacggtcgc	420
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gccgcgctgc	tctacggtga	cgtcaaccgc	agcgggaagc	tcacgcagag	cttcccggcc	1980
gccgagaacc	agcacgcggt	cgccggcgac	ccgacaagct	acccgggcgt	cgacaaccag	2040
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<210> 24

<211> 809

<212> PRT

<213> Streptomyces venezuelae

<400> 24

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Thr	Val	Ala	Ala	Ala	Ala	Pro	Gly	Ala	Ala	Asp	Thr	Ala	Asn	Val	Gln	
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Tyr	Thr	Ser	Arg	Ala	Ala	Glu	Leu	Val	Ala	Gln	Met	Thr	Leu	Asp	Glu	
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Lys	Ile	Ser	Phe	Val	His	Trp	Ala	Leu	Asp	Pro	Asp	Arg	Gln	Asn	Val	
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Gly	Tyr	Leu	Pro	Gly	Val	Pro	Arg	Leu	Gly	Ile	Pro	Glu	Leu	Arg	Ala	
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Ala	Asp	Gly	Pro	Asn	Gly	Ile	Arg	Leu	Val	Gly	Gln	Thr	Ala	Thr	Ala	
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Asp	Ser	Tyr	Gly	Lys	Val	Met	Gly	Arg	Asp	Gly	Arg	Ala	Leu	Asn	Gln	
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Asp	Met	Val	Leu	Gly	Pro	Met	Met	Asn	Asn	Ile	Arg	Val	Pro	His	Gly	
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Gly	Arg	Asn	Tyr	Glu	Thr	Phe	Ser	Glu	Asp	Pro	Leu	Val	Ser	Ser	Arg	
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Thr	Ala	Val	Ala	Gln	Ile	Lys	Gly	Ile	Gln	Gly	Ala	Gly	Leu	Met	Thr	
		180					185						190			
Thr	Ala	Lys	His	Phe	Ala	Ala	Asn	Asn	Gln	Glu	Asn	Asn	Arg	Phe	Ser	
		195					200					205				
Val	Asn	Ala	Asn	Val	Asp	Glu	Gln	Thr	Leu	Arg	Glu	Ile	Glu	Phe	Pro	
	210				215						220					
Ala	Phe	Glu	Ala	Ser	Ser	Lys	Ala	Gly	Ala	Ala	Ser	Phe	Met	Cys	Ala	
225				230					235					240		
Tyr	Asn	Gly	Leu	Asn	Gly	Lys	Pro	Ser	Cys	Gly	Asn	Asp	Glu	Leu	Leu	
			245					250					255			
Asn	Asn	Val	Leu	Arg	Thr	Gln	Trp	Gly	Phe	Gln	Gly	Trp	Val	Met	Ser	
		260					265					270				
Asp	Trp	Leu	Ala	Thr	Pro	Gly	Thr	Asp	Ala	Ile	Thr	Lys	Gly	Leu	Asp	
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Gln	Glu	Met	Gly	Val	Glu	Leu	Pro	Gly	Asp	Val	Pro	Lys	Gly	Glu	Pro	
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Ser	Pro	Pro	Ala	Lys	Phe	Gly	Glu	Ala	Leu	Lys	Thr	Ala	Val	Leu		
305				310					315					320		
Asn	Gly	Thr	Val	Pro	Glu	Ala	Ala	Val	Thr	Arg	Ser	Ala	Glu	Arg	Ile	
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Val	Gly	Gln	Met	Glu	Lys	Phe	Gly	Leu	Leu	Leu	Ala	Thr	Pro	Ala	Pro	
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Arg	Pro	Glu	Arg	Asp	Lys	Ala	Gly	Ala	Gln	Ala	Val	Ser	Arg	Lys	Val	
	355					360					365					
Ala	Glu	Asn	Gly	Ala	Val	Leu	Leu	Arg	Asn	Glu	Gly	Gln	Ala	Leu	Pro	
	370				375						380					

Leu	Ala	Gly	Asp	Ala	Gly	Lys	Ser	Ile	Ala	Val	Ile	Gly	Pro	Thr	Ala	385	390	395	400
Val	Asp	Pro	Lys	Val	Thr	Gly	Leu	Gly	Ser	Ala	His	Val	Val	Pro	Asp	405	410	415	
Ser	Ala	Ala	Ala	Pro	Leu	Asp	Thr	Ile	Lys	Ala	Arg	Ala	Gly	Ala	Gly	420	425	430	
Ala	Thr	Val	Thr	Tyr	Glu	Thr	Gly	Glu	Glu	Thr	Phe	Gly	Thr	Gln	Ile	435	440	445	
Pro	Ala	Gly	Asn	Leu	Ser	Pro	Ala	Phe	Asn	Gln	Gly	His	Gln	Leu	Glu	450	455	460	
Pro	Gly	Lys	Ala	Gly	Ala	Leu	Tyr	Asp	Gly	Thr	Leu	Thr	Val	Pro	Ala	465	470	475	480
Asp	Gly	Glu	Tyr	Arg	Ile	Ala	Val	Arg	Ala	Thr	Gly	Gly	Tyr	Ala	Thr	485	490	495	
Val	Gln	Leu	Gly	Ser	His	Thr	Ile	Glu	Ala	Gly	Gln	Val	Tyr	Gly	Lys	500	505	510	
Val	Ser	Ser	Pro	Leu	Leu	Lys	Leu	Thr	Lys	Gly	Thr	His	Lys	Leu	Thr	515	520	525	
Ile	Ser	Gly	Phe	Ala	Met	Ser	Ala	Thr	Pro	Leu	Ser	Leu	Glu	Leu	Gly	530	535	540	
Trp	Val	Thr	Pro	Ala	Ala	Ala	Asp	Ala	Thr	Ile	Ala	Lys	Ala	Val	Glu	545	550	555	560
Ser	Ala	Arg	Lys	Ala	Arg	Thr	Ala	Val	Val	Phe	Ala	Tyr	Asp	Asp	Gly	565	570	575	
Thr	Glu	Gly	Val	Asp	Arg	Pro	Asn	Leu	Ser	Leu	Pro	Gly	Thr	Gln	Asp	580	585	590	
Lys	Leu	Ile	Ser	Ala	Val	Ala	Asp	Ala	Asn	Pro	Asn	Thr	Ile	Val	Val	595	600	605	
Leu	Asn	Thr	Gly	Ser	Ser	Val	Leu	Met	Pro	Trp	Leu	Ser	Lys	Thr	Arg	610	615	620	
Ala	Val	Leu	Asp	Met	Trp	Tyr	Pro	Gly	Gln	Ala	Gly	Ala	Glu	Ala	Thr	625	630	635	640
Ala	Ala	Leu	Leu	Tyr	Gly	Asp	Val	Asn	Pro	Ser	Gly	Lys	Leu	Thr	Gln	645	650	655	
Ser	Phe	Pro	Ala	Ala	Glu	Asn	Gln	His	Ala	Val	Ala	Gly	Asp	Pro	Thr	660	665	670	
Ser	Tyr	Pro	Gly	Val	Asp	Asn	Gln	Gln	Thr	Tyr	Arg	Glu	Gly	Ile	His	675	680	685	
Val	Gly	Tyr	Arg	Trp	Phe	Asp	Lys	Glu	Asn	Val	Lys	Pro	Leu	Phe	Pro	690	695	700	
Phe	Gly	His	Gly	Leu	Ser	Tyr	Thr	Ser	Phe	Thr	Gln	Ser	Ala	Pro	Thr	705	710	715	720
Val	Val	Arg	Thr	Ser	Thr	Gly	Gly	Leu	Lys	Val	Thr	Val	Thr	Val	Arg	725	730	735	
Asn	Ser	Gly	Lys	Arg	Ala	Gly	Gln	Glu	Val	Val	Gln	Ala	Tyr	Leu	Gly	740	745	750	
Ala	Ser	Pro	Asn	Val	Thr	Ala	Pro	Gln	Ala	Lys	Lys	Lys	Leu	Val	Gly	755	760	765	
Tyr	Thr	Lys	Val	Ser	Leu	Ala	Ala	Gly	Glu	Ala	Lys	Thr	Val	Thr	Val	770	775	780	
Asn	Val	Asp	Arg	Arg	Gln	Leu	Gln	Thr	Gly	Ser	Ser	Ser	Ala	Asp	Leu	785	790	795	800
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<210> 25

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> A synthetic consensus sequence.

<220>  
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 <223> Residue 4 is either V or I.

<400> 25  
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<210> 26  
 <211> 1011  
 <212> DNA  
 <213> Streptomyces venezuelae

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 cgctccttcg acaccgtgac ggtcgtggag atggaccgc actgggccc gcattgtgcg 240  
 cggaaattcg aaggggagag ggtcacgta ttccagggtg atttctcga cttccgcatt 300  
 ccgcgcgata tcgacaccgt cgtcggaaac gttcccttcg gcatcacgac ccagattctc 360  
 cggagtctcc tggaaatcgac gaactggcag tcggcgggccc tgatagtga gtgggaggtc 420  
 gcccgcgaac gcgcgggtcg cagcgggcga tcgtctctca cgacctctg gggcccctgg 480  
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 gacggcgggc tcctgacgat caggcgacgc cccagagccc tgcgtccga gagcgcgagc 600  
 cgcgccctcc agaacttcgc cgaagccgtc ttaccggccc ccggacgggg cctcgcggag 660  
 atcctccggc gccacatccc caagcggacc taccgttccc tcgccgaccg ccacggaatt 720  
 ccggacggcg gactgccgaa ggacctcacg ctcacccaat ggatcgccct tttccaggcc 780  
 tcccagccga gttacgcgcc gggggcgccc ggcacgcgca tgcggggcca gggcggtggc 840  
 gccggcgga gggactatga ctcgagacg agcagggccg ccgtgcccgg gagccgcaga 900  
 tacggcccca cgcgcgggcg cgaacctgc gcaccccgcg cacaggtccg gcagaccaag 960  
 ggccgcccagg gcgcgcgagg ctgctcgta ggacgcgca cgggcccgtta g 1011

<210> 27  
 <211> 336  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 27  
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 Asn Leu Val Thr His Val Glu Gly Asp Gly Arg Asn Val Leu Glu Ile  
 35 40 45  
 Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser Phe Asp  
 50 55 60  
 Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His Val Arg  
 65 70 75 80  
 Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp Phe Leu  
 85 90 95  
 Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn Val Pro  
 100 105 110  
 Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser Thr Asn  
 115 120 125  
 Trp Gln Ser Ala Ala Leu Ile Val Gln Trp Glu Val Ala Arg Lys Arg  
 130 135 140  
 Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala Pro Trp  
 145 150 155 160  
 Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe Arg Pro  
 165 170 175

Met	Pro	Arg	Val	Asp	Gly	Gly	Val	Leu	Thr	Ile	Arg	Arg	Arg	Pro	Gln
			180					185					190		
Pro	Leu	Leu	Pro	Glu	Ser	Ala	Ser	Arg	Ala	Phe	Gln	Asn	Phe	Ala	Glu
		195					200					205			
Ala	Val	Phe	Thr	Gly	Pro	Gly	Arg	Gly	Leu	Ala	Glu	Ile	Leu	Arg	Arg
		210				215					220				
His	Ile	Pro	Lys	Arg	Thr	Tyr	Arg	Ser	Leu	Ala	Asp	Arg	His	Gly	Ile
225					230				235					240	
Pro	Asp	Gly	Gly	Leu	Pro	Lys	Asp	Leu	Thr	Leu	Thr	Gln	Trp	Ile	Ala
			245					250						255	
Leu	Phe	Gln	Ala	Ser	Gln	Pro	Ser	Tyr	Ala	Pro	Gly	Ala	Pro	Gly	Thr
		260						265					270		
Arg	Met	Pro	Gly	Gln	Gly	Gly	Gly	Ala	Gly	Gly	Arg	Asp	Tyr	Asp	Ser
		275					280					285			
Glu	Thr	Ser	Arg	Ala	Ala	Val	Pro	Gly	Ser	Arg	Arg	Tyr	Gly	Pro	Thr
	290					295					300				
Arg	Gly	Gly	Glu	Pro	Cys	Ala	Pro	Arg	Ala	Gln	Val	Arg	Gln	Thr	Lys
305					310					315					320
Gly	Arg	Gln	Gly	Ala	Arg	Gly	Ser	Ser	Tyr	Gly	Arg	Arg	Thr	Gly	Arg
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<210> 28

<211> 969

<212> DNA

<213> Streptomyces venezuelae

<400> 28

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gggtccgggtg	acggcgccct	gaccctgccg	ctgagcaggc	acggcaggcc	gatcaccgcc	180
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gtggtgcacc	acgacttcct	gcagtaccgg	ctgccgcgca	acccgcatgt	ggtcgtcggc	300
aacgtccctt	tccatctgac	gacggcgatc	atgcggcggc	tgctcgacgc	ccagcactgg	360
cacaccgccg	tcctcctcgt	ccagtgggag	gtcgcccggc	gccggggccgg	cgtcggcgggg	420
tcgacgctgc	tgacggccgg	ctgggcgccc	tggtacgagt	tcgacctgca	ctcccgggtc	480
cccgcgcggg	ccttcctgcc	gatgccgggc	gtggacggag	gagtactggc	catccggcgg	540
cgggtccgcgc	cgctcgtggg	ccagggtgaag	acgtaccagg	acttcgtacg	ccagggtgttc	600
accggcaagg	ggaacgggct	gaaggagatc	ctgcggcgga	ccggggcgat	ctcgcagcgg	660
gacctggcga	cctggctgcg	gaggaacgag	atctcgccgc	acgcgctgcc	caaggacctg	720
aagcccgggc	agtgggcgtc	gctgtgggag	ctgaccggcg	gcacggccga	cggatccttc	780
gacggtacgg	cgggcgggtg	cgcggccgga	tcgcacgggg	cggctcgggt	cggggccggg	840
cacccgggcg	gccgggtgtc	cgcgagccgg	cggggcggtg	cgcaggcgcg	gcgcggccgg	900
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<210> 29

<211> 322

<212> PRT

<213> Streptomyces venezuelae

<400> 29

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		20					25					30			
Thr	Lys	Gly	Pro	Ile	Leu	Glu	Ile	Gly	Pro	Gly	Asp	Gly	Ala	Leu	Thr
	35					40					45				
Leu	Pro	Leu	Ser	Arg	His	Gly	Arg	Pro	Ile	Thr	Ala	Val	Glu	Leu	Asp
	50				55				60						
Gly	Arg	Arg	Ala	Gln	Arg	Leu	Gly	Ala	Arg	Thr	Pro	Gly	His	Val	Thr
65				70				75						80	

Val	Val	His	His	Asp	Phe	Leu	Gln	Tyr	Pro	Leu	Pro	Arg	Asn	Pro	His
				85					90				95		
Val	Val	Val	Gly	Asn	Val	Pro	Phe	His	Leu	Thr	Thr	Ala	Ile	Met	Arg
			100					105					110		
Arg	Leu	Leu	Asp	Ala	Gln	His	Trp	His	Thr	Ala	Val	Leu	Leu	Val	Gln
			115				120					125			
Trp	Glu	Val	Ala	Arg	Arg	Arg	Ala	Gly	Val	Gly	Gly	Ser	Thr	Leu	Leu
	130					135					140				
Thr	Ala	Gly	Trp	Ala	Pro	Trp	Tyr	Glu	Phe	Asp	Leu	His	Ser	Arg	Val
	145				150					155					160
Pro	Ala	Arg	Ala	Phe	Arg	Pro	Met	Pro	Gly	Val	Asp	Gly	Gly	Val	Leu
				165					170					175	
Ala	Ile	Arg	Arg	Arg	Ser	Ala	Pro	Leu	Val	Gly	Gln	Val	Lys	Thr	Tyr
			180					185					190		
Gln	Asp	Phe	Val	Arg	Gln	Val	Phe	Thr	Gly	Lys	Gly	Asn	Gly	Leu	Lys
	195						200					205			
Glu	Ile	Leu	Arg	Arg	Thr	Gly	Arg	Ile	Ser	Gln	Arg	Asp	Leu	Ala	Thr
	210					215					220				
Trp	Leu	Arg	Arg	Asn	Glu	Ile	Ser	Pro	His	Ala	Leu	Pro	Lys	Asp	Leu
	225				230					235					240
Lys	Pro	Gly	Gln	Trp	Ala	Ser	Leu	Trp	Glu	Leu	Thr	Gly	Gly	Thr	Ala
				245					250					255	
Asp	Gly	Ser	Phe	Asp	Gly	Thr	Ala	Gly	Gly	Gly	Ala	Ala	Gly	Ser	His
			260					265					270		
Gly	Ala	Ala	Arg	Val	Gly	Ala	Gly	His	Pro	Gly	Gly	Arg	Val	Ser	Ala
	275					280						285			
Ser	Arg	Arg	Gly	Val	Pro	Gln	Ala	Arg	Arg	Gly	Arg	Gly	His	Ala	Val
	290					295					300				
Arg	Ser	Ser	Thr	Gly	Thr	Glu	Pro	Arg	Trp	Gly	Arg	Gly	Arg	Ala	Glu
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Ser	Ala														

<210> 30

<211> 13842

<212> DNA

<213> Streptomyces venezuelae

<400> 30

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catgcggagc	actccttctc	tcgtgctcct	accggtgatg	tgcgcgccga	attgattcgt	180
ggagagatgt	cgacagtgtc	caagagtgtg	tccgaggaat	tcgtgtccgt	gtcgaacgac	240
gccggttccg	cgacaggcac	agcggaaacc	gtcgccgtcg	tcggcatctc	ctgccgggtg	300
ccggcgcccc	gggacccgag	agagttctgg	gaactcctgg	cggcaggcgg	ccaggccgtc	360
accgacgtcc	ccgcggaccg	ctggaacgcc	ggcgacttct	acgaccgga	ccgctccgcc	420
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gccttcttcg	gcatctcgcc	ccgcgaggcc	gcggagatgg	acccgcagca	gcggctcgcc	540
ctggagctgg	gctgggaggg	cctggagcgc	gccgggatcg	acccgtcctc	gctcaccggc	600
acccgcaccg	gcgtcttcgc	cggcgccatc	tgggacgact	acgccaccct	gaagcaccgc	660
cagggcggcg	ccgcgatcac	ccgcacacc	gtcaccggcc	tccaccgcg	catcatcgcg	720
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gaccgccacc	cggctctgct	gcccctgcgg	ctcgacgccg	ccgggctgcg	ggacgcggcc	13020
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gccggggcg	ggagtgaagga	cggcgcgggg	gtgccgggact	tcatgaacgc	ctcggccgag	13800
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<211> 4613

<212> PRT

<213> Streptomyces venezuelae

<400> 31

Met	Ser	Ser	Ala	Gly	Ile	Thr	Arg	Thr	Gly	Ala	Arg	Thr	Pro	Val	Thr
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Gly	Arg	Gly	Ala	Ala	Ala	Trp	Asp	Thr	Gly	Glu	Val	Arg	Val	Arg	Arg
			20					25					30		
Gly	Leu	Pro	Pro	Ala	Gly	Pro	Asp	His	Ala	Glu	His	Ser	Phe	Ser	Arg
		35					40					45			
Ala	Pro	Thr	Gly	Asp	Val	Arg	Ala	Glu	Leu	Ile	Arg	Gly	Glu	Met	Ser
	50					55					60				
Thr	Val	Ser	Lys	Ser	Glu	Ser	Glu	Glu	Phe	Val	Ser	Val	Ser	Asn	Asp
65				70					75					80	
Ala	Gly	Ser	Ala	His	Gly	Thr	Ala	Glu	Pro	Val	Ala	Val	Val	Gly	Ile
			85						90					95	
Ser	Cys	Arg	Val	Pro	Gly	Ala	Arg	Asp	Pro	Arg	Glu	Phe	Trp	Glu	Leu
			100					105					110		
Leu	Ala	Ala	Gly	Gly	Gln	Ala	Val	Thr	Asp	Val	Pro	Ala	Asp	Arg	Trp
		115				120						125			
Asn	Ala	Gly	Asp	Phe	Tyr	Asp	Pro	Asp	Arg	Ser	Ala	Pro	Gly	Arg	Ser
	130					135					140				
Asn	Ser	Arg	Trp	Gly	Gly	Phe	Ile	Glu	Asp	Val	Asp	Arg	Phe	Asp	Ala
145				150					155					160	
Ala	Phe	Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Ala	Glu	Met	Asp	Pro	Gln
			165					170						175	
Gln	Arg	Leu	Ala	Leu	Glu	Leu	Gly	Trp	Glu	Ala	Leu	Glu	Arg	Ala	Gly
		180					185						190		
Ile	Asp	Pro	Ser	Ser	Leu	Thr	Gly	Thr	Arg	Thr	Gly	Val	Phe	Ala	Gly
	195						200					205			
Ala	Ile	Trp	Asp	Asp	Tyr	Ala	Thr	Leu	Lys	His	Arg	Gln	Gly	Gly	Ala
	210					215					220				
Ala	Ile	Thr	Pro	His	Thr	Val	Thr	Gly	Leu	His	Arg	Gly	Ile	Ile	Ala
225				230					235					240	

Asn	Arg	Leu	Ser	Tyr	Thr	Leu	Gly	Leu	Arg	Gly	Pro	Ser	Met	Val	Val	245	250	255
Asp	Ser	Gly	Gln	Ser	Ser	Ser	Leu	Val	Ala	Val	His	Leu	Ala	Cys	Glu	260	265	270
Ser	Leu	Arg	Arg	Gly	Glu	Ser	Glu	Leu	Ala	Leu	Ala	Gly	Gly	Val	Ser	275	280	285
Leu	Asn	Leu	Val	Pro	Asp	Ser	Ile	Ile	Gly	Ala	Ser	Lys	Phe	Gly	Gly	290	295	300
Leu	Ser	Pro	Asp	Gly	Arg	Ala	Tyr	Thr	Phe	Asp	Ala	Arg	Ala	Asn	Gly	305	310	315
Tyr	Val	Arg	Gly	Glu	Gly	Gly	Gly	Phe	Val	Val	Leu	Lys	Arg	Leu	Ser	325	330	335
Arg	Ala	Val	Ala	Asp	Gly	Asp	Pro	Val	Leu	Ala	Val	Ile	Arg	Gly	Ser	340	345	350
Ala	Val	Asn	Asn	Gly	Gly	Ala	Ala	Gln	Gly	Met	Thr	Thr	Pro	Asp	Ala	355	360	365
Gln	Ala	Gln	Glu	Ala	Val	Leu	Arg	Glu	Ala	His	Glu	Arg	Ala	Gly	Thr	370	375	380
Ala	Pro	Ala	Asp	Val	Arg	Tyr	Val	Glu	Leu	His	Gly	Thr	Gly	Thr	Pro	385	390	395
Val	Gly	Asp	Pro	Ile	Glu	Ala	Ala	Ala	Leu	Gly	Ala	Ala	Leu	Gly	Thr	405	410	415
Gly	Arg	Pro	Ala	Gly	Gln	Pro	Leu	Leu	Val	Gly	Ser	Val	Lys	Thr	Asn	420	425	430
Ile	Gly	His	Leu	Glu	Gly	Ala	Ala	Gly	Ile	Ala	Gly	Leu	Ile	Lys	Ala	435	440	445
Val	Leu	Ala	Val	Arg	Gly	Arg	Ala	Leu	Pro	Ala	Ser	Leu	Asn	Tyr	Glu	450	455	460
Thr	Pro	Asn	Pro	Ala	Ile	Pro	Phe	Glu	Glu	Leu	Asn	Leu	Arg	Val	Asn	465	470	475
Thr	Glu	Tyr	Leu	Pro	Trp	Glu	Pro	Glu	His	Asp	Gly	Gln	Arg	Met	Val	485	490	495
Val	Gly	Val	Ser	Ser	Phe	Gly	Met	Gly	Gly	Thr	Asn	Ala	His	Val	Val	500	505	510
Leu	Glu	Glu	Ala	Pro	Gly	Gly	Cys	Arg	Gly	Ala	Ser	Val	Val	Glu	Ser	515	520	525
Thr	Val	Gly	Gly	Ser	Ala	Val	Gly	Gly	Gly	Val	Val	Pro	Trp	Val	Val	530	535	540
Ser	Ala	Lys	Ser	Ala	Ala	Ala	Ala	Leu	Asp	Ala	Gln	Ile	Glu	Arg	Leu	545	550	555
Ala	Phe	Ala	Ser	Arg	Asp	Arg	Thr	Asp	Gly	Val	Asp	Ala	Gly	Ala	Val	565	570	575
Asp	Ala	Gly	Ala	Val	Asp	Ala	Gly	Ala	Val	Ala	Arg	Val	Leu	Ala	Gly	580	585	590
Gly	Arg	Ala	Gln	Phe	Glu	His	Arg	Ala	Val	Val	Val	Gly	Ser	Gly	Pro	595	600	605
Asp	Asp	Leu	Ala	Ala	Ala	Leu	Ala	Ala	Pro	Glu	Gly	Leu	Val	Arg	Gly	610	615	620
Val	Ala	Ser	Gly	Val	Gly	Arg	Val	Ala	Phe	Val	Phe	Pro	Gly	Gln	Gly	625	630	635
Thr	Gln	Trp	Ala	Gly	Met	Gly	Ala	Glu	Leu	Leu	Asp	Ser	Ser	Ala	Val	645	650	655
Phe	Ala	Ala	Ala	Met	Ala	Glu	Cys	Glu	Ala	Ala	Leu	Ser	Pro	Tyr	Val	660	665	670
Asp	Trp	Ser	Leu	Glu	Ala	Val	Val	Arg	Gln	Ala	Pro	Gly	Ala	Pro	Thr	675	680	685
Leu	Glu	Arg	Val	Asp	Val	Val	Gln	Pro	Val	Thr	Phe	Ala	Val	Met	Val	690	695	700
Ser	Leu	Ala	Arg	Val	Trp	Gln	His	His	Gly	Val	Thr	Pro	Gln	Ala	Val	705	710	715
Val	Gly	His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	Tyr	Val	Ala	Gly	Ala		725	730	735

Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser  
 740 745 750  
 Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Leu Ser Leu Ala Leu  
 755 760 765  
 Ser Glu Asp Ala Val Leu Glu Arg Leu Ala Gly Phe Asp Gly Leu Ser  
 770 775 780  
 Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro  
 785 790 795 800  
 Val Gln Ile Glu Glu Leu Ala Arg Ala Cys Glu Ala Asp Gly Val Arg  
 805 810 815  
 Ala Arg Val Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu  
 820 825 830  
 Ile Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser Pro Gln  
 835 840 845  
 Ala Pro Arg Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp Ile Thr  
 850 855 860  
 Glu Pro Val Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg His Arg  
 865 870 875 880  
 Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu Gly Phe  
 885 890 895  
 Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met Ala Leu  
 900 905 910  
 Pro Gly Thr Val Thr Gly Leu Ala Thr Leu Arg Arg Asp Asn Gly Gly  
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 Gln Asp Arg Leu Val Ala Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu  
 930 935 940  
 Ala Val Asp Trp Ser Pro Leu Leu Pro Ser Ala Thr Gly His His Ser  
 945 950 955 960  
 Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg His Trp Leu Gly Glu  
 965 970 975  
 Ile Glu Ala Leu Ala Pro Ala Gly Glu Pro Ala Val Gln Pro Ala Val  
 980 985 990  
 Leu Arg Thr Glu Ala Ala Glu Pro Ala Glu Leu Asp Arg Asp Glu Gln  
 995 1000 1005  
 Leu Arg Val Ile Leu Asp Lys Val Arg Ala Gln Thr Ala Gln Val Leu  
 1010 1015 1020  
 Gly Tyr Ala Thr Gly Gly Gln Ile Glu Val Asp Arg Thr Phe Arg Glu  
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 Ala Gly Cys Thr Ser Leu Thr Gly Val Asp Leu Arg Asn Arg Ile Asn  
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 Ala Ala Phe Gly Val Arg Met Ala Pro Ser Met Ile Phe Asp Phe Pro  
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 Thr Pro Glu Ala Leu Ala Glu Gln Leu Leu Leu Val Val His Gly Glu  
 1075 1080 1085  
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 1090 1095 1100  
 Gly Ala Val Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu  
 1105 1110 1115 1120  
 Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Gly  
 1125 1130 1135  
 Gly Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val  
 1140 1145 1150  
 Glu Gly Leu Tyr His Pro Asp Pro Glu His Pro Gly Thr Ser Tyr Val  
 1155 1160 1165  
 Arg Gln Gly Gly Phe Ile Glu Asn Val Ala Gly Phe Asp Ala Ala Phe  
 1170 1175 1180  
 Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg  
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 Leu Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly Ile Asp  
 1205 1210 1215  
 Pro Thr Ser Leu Arg Gly Arg Gln Val Gly Val Phe Thr Gly Ala Met  
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Thr	His	Glu	Tyr	Gly	Pro	Ser	Leu	Arg	Asp	Gly	Gly	Glu	Gly	Leu	Asp	1235	1240	1245
Gly	Tyr	Leu	Leu	Thr	Gly	Asn	Thr	Ala	Ser	Val	Met	Ser	Gly	Arg	Val	1250	1255	1260
Ser	Tyr	Thr	Leu	Gly	Leu	Glu	Gly	Pro	Ala	Leu	Thr	Val	Asp	Thr	Ala	1265	1270	1275
Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Val	Gln	Ala	Leu	Arg	1285	1290	1295
Lys	Gly	Glu	Val	Asp	Met	Ala	Leu	Ala	Gly	Gly	Val	Ala	Val	Met	Pro	1300	1305	1310
Thr	Pro	Gly	Met	Phe	Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Gly	1315	1320	1325
Asp	Gly	Arg	Ser	Lys	Ala	Phe	Ala	Ala	Ser	Ala	Asp	Gly	Thr	Ser	Trp	1330	1335	1340
Ser	Glu	Gly	Val	Gly	Val	Leu	Leu	Val	Glu	Arg	Leu	Ser	Asp	Ala	Arg	1345	1350	1355
Arg	Asn	Gly	His	Gln	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Leu	Asn	1365	1370	1375
Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ser	Gln	1380	1385	1390
Gln	Arg	Val	Ile	Arg	Arg	Ala	Leu	Ala	Asp	Ala	Arg	Leu	Thr	Thr	Ser	1395	1400	1405
Asp	Val	Asp	Val	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	1410	1415	1420
Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Gln	Gly	Arg	Asp	1425	1430	1435
Asp	Glu	Gln	Pro	Leu	Arg	Leu	Gly	Ser	Leu	Lys	Ser	Asn	Ile	Gly	His	1445	1450	1455
Thr	Gln	Ala	Ala	Ala	Gly	Val	Ser	Gly	Val	Ile	Lys	Met	Val	Gln	Ala	1460	1465	1470
Met	Arg	His	Gly	Leu	Leu	Pro	Lys	Thr	Leu	His	Val	Asp	Glu	Pro	Ser	1475	1480	1485
Asp	Gln	Ile	Asp	Trp	Ser	Ala	Gly	Ala	Val	Glu	Leu	Leu	Thr	Glu	Ala	1490	1495	1500
Val	Asp	Trp	Pro	Glu	Lys	Gln	Asp	Gly	Gly	Leu	Arg	Arg	Ala	Ala	Val	1505	1510	1515
Ser	Ser	Phe	Gly	Ile	Ser	Gly	Thr	Asn	Ala	His	Val	Val	Leu	Glu	Glu	1525	1530	1535
Ala	Pro	Val	Val	Val	Glu	Gly	Ala	Ser	Val	Val	Glu	Pro	Ser	Val	Gly	1540	1545	1550
Gly	Ser	Ala	Val	Gly	Gly	Gly	Val	Thr	Pro	Trp	Val	Val	Ser	Ala	Lys	1555	1560	1565
Ser	Ala	Ala	Ala	Leu	Asp	Ala	Gln	Ile	Glu	Arg	Leu	Ala	Ala	Phe	Ala	1570	1575	1580
Ser	Arg	Asp	Arg	Thr	Asp	Asp	Ala	Asp	Ala	Gly	Ala	Val	Asp	Ala	Gly	1585	1590	1595
Ala	Val	Ala	His	Val	Leu	Ala	Asp	Gly	Arg	Ala	Gln	Phe	Glu	His	Arg	1605	1610	1615
Ala	Val	Ala	Leu	Gly	Ala	Gly	Ala	Asp	Asp	Leu	Val	Gln	Ala	Leu	Ala	1620	1625	1630
Asp	Pro	Asp	Gly	Leu	Ile	Arg	Gly	Thr	Ala	Ser	Gly	Val	Gly	Arg	Val	1635	1640	1645
Ala	Phe	Val	Phe	Pro	Gly	Gln	Gly	Thr	Gln	Trp	Ala	Gly	Met	Gly	Ala	1650	1655	1660
Glu	Leu	Leu	Asp	Ser	Ser	Ala	Val	Phe	Ala	Ala	Ala	Met	Ala	Glu	Cys	1665	1670	1675
Glu	Ala	Ala	Leu	Ser	Pro	Tyr	Val	Asp	Trp	Ser	Leu	Glu	Ala	Val	Val	1685	1690	1695
Arg	Gln	Ala	Pro	Gly	Ala	Pro	Thr	Leu	Glu	Arg	Val	Asp	Val	Val	Gln	1700	1705	1710
Pro	Val	Thr	Phe	Ala	Val	Met	Val	Ser	Leu	Ala	Arg	Val	Trp	Gln	His	1715	1720	1725

His	Gly	Val	Thr	Pro	Gln	Ala	Val	Val	Gly	His	Ser	Gln	Gly	Glu	Ile	1730	1735	1740
Ala	Ala	Ala	Tyr	Val	Ala	Gly	Ala	Leu	Pro	Leu	Asp	Asp	Ala	Ala	Arg	1745	1750	1755
Val	Val	Thr	Leu	Arg	Ser	Lys	Ser	Ile	Ala	Ala	His	Leu	Ala	Gly	Lys	1765	1770	1775
Gly	Gly	Met	Leu	Ser	Leu	Ala	Leu	Asn	Glu	Asp	Ala	Val	Leu	Glu	Arg	1780	1785	1790
Leu	Ser	Asp	Phe	Asp	Gly	Leu	Ser	Val	Ala	Ala	Val	Asn	Gly	Pro	Thr	1795	1800	1805
Ala	Thr	Val	Val	Ser	Gly	Asp	Pro	Val	Gln	Ile	Glu	Glu	Leu	Ala	Gln	1810	1815	1820
Ala	Cys	Lys	Ala	Asp	Gly	Phe	Arg	Ala	Arg	Ile	Ile	Pro	Val	Asp	Tyr	1825	1830	1835
Ala	Ser	His	Ser	Arg	Gln	Val	Glu	Ile	Ile	Glu	Ser	Glu	Leu	Ala	Gln	1845	1850	1855
Val	Leu	Ala	Gly	Leu	Ser	Pro	Gln	Ala	Pro	Arg	Val	Pro	Phe	Phe	Ser	1860	1865	1870
Thr	Leu	Glu	Gly	Thr	Trp	Ile	Thr	Glu	Pro	Val	Leu	Asp	Gly	Thr	Tyr	1875	1880	1885
Trp	Tyr	Arg	Asn	Leu	Arg	His	Arg	Val	Gly	Phe	Ala	Pro	Ala	Ile	Glu	1890	1895	1900
Thr	Leu	Ala	Val	Asp	Glu	Gly	Phe	Thr	His	Phe	Val	Glu	Val	Ser	Ala	1905	1910	1915
His	Pro	Val	Leu	Thr	Met	Thr	Leu	Pro	Glu	Thr	Val	Thr	Gly	Leu	Gly	1925	1930	1935
Thr	Leu	Arg	Arg	Glu	Gln	Gly	Gly	Gln	Glu	Arg	Leu	Val	Thr	Ser	Leu	1940	1945	1950
Ala	Glu	Ala	Trp	Val	Asn	Gly	Leu	Pro	Val	Ala	Trp	Thr	Ser	Leu	Leu	1955	1960	1965
Pro	Ala	Thr	Ala	Ser	Arg	Pro	Gly	Leu	Pro	Thr	Tyr	Ala	Phe	Gln	Ala	1970	1975	1980
Glu	Arg	Tyr	Trp	Leu	Glu	Asn	Thr	Pro	Ala	Ala	Leu	Ala	Thr	Gly	Asp	1985	1990	1995
Asp	Trp	Arg	Tyr	Arg	Ile	Asp	Trp	Lys	Arg	Leu	Pro	Ala	Ala	Glu	Gly	2005	2010	2015
Ser	Glu	Arg	Thr	Gly	Leu	Ser	Gly	Arg	Trp	Leu	Ala	Val	Thr	Pro	Glu	2020	2025	2030
Asp	His	Ser	Ala	Gln	Ala	Ala	Ala	Val	Leu	Thr	Ala	Leu	Val	Asp	Ala	2035	2040	2045
Gly	Ala	Lys	Val	Glu	Val	Leu	Thr	Ala	Gly	Ala	Asp	Asp	Asp	Arg	Glu	2050	2055	2060
Ala	Leu	Ala	Ala	Arg	Leu	Thr	Ala	Leu	Thr	Thr	Gly	Asp	Gly	Phe	Thr	2065	2070	2075
Gly	Val	Val	Ser	Leu	Leu	Asp	Gly	Leu	Val	Pro	Gln	Val	Ala	Trp	Val	2085	2090	2095
Gln	Ala	Leu	Gly	Asp	Ala	Gly	Ile	Lys	Ala	Pro	Leu	Trp	Ser	Val	Thr	2100	2105	2110
Gln	Gly	Ala	Val	Ser	Val	Gly	Arg	Leu	Asp	Thr	Pro	Ala	Asp	Pro	Asp	2115	2120	2125
Arg	Ala	Met	Leu	Trp	Gly	Leu	Gly	Arg	Val	Val	Ala	Leu	Glu	His	Pro	2130	2135	2140
Glu	Arg	Trp	Ala	Gly	Leu	Val	Asp	Leu	Pro	Ala	Gln	Pro	Asp	Ala	Ala	2145	2150	2155
Ala	Leu	Ala	His	Leu	Val	Thr	Ala	Leu	Ser	Gly	Ala	Thr	Gly	Glu	Asp	2165	2170	2175
Gln	Ile	Ala	Ile	Arg	Thr	Thr	Gly	Leu	His	Ala	Arg	Arg	Leu	Ala	Arg	2180	2185	2190
Ala	Pro	Leu	His	Gly	Arg	Arg	Pro	Thr	Arg	Asp	Trp	Gln	Pro	His	Gly	2195	2200	2205
Thr	Val	Leu	Ile	Thr	Gly	Gly	Thr	Gly	Ala	Leu	Gly	Ser	His	Ala	Ala	2210	2215	2220

Arg Trp Met Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg  
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 Ser Gly Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr  
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 Ala Ser Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro  
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 His Ala Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu  
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 Gly Ala Ser Val Leu Asp Glu Leu Thr Arg Asp Leu Asp Leu Asp Ala  
 2325 2330 2335  
 Phe Val Leu Phe Ser Ser Val Ser Ser Thr Leu Gly Ile Pro Gly Gln  
 2340 2345 2350  
 Gly Asn Tyr Ala Pro His Asn Ala Tyr Leu Asp Ala Leu Ala Ala Arg  
 2355 2360 2365  
 Arg Arg Ala Thr Gly Arg Ser Ala Val Ser Val Ala Trp Gly Pro Trp  
 2370 2375 2380  
 Asp Gly Gly Gly Met Ala Ala Gly Asp Gly Val Ala Glu Arg Leu Arg  
 2385 2390 2395 2400  
 Asn His Gly Val Pro Gly Met Asp Pro Glu Leu Ala Leu Ala Ala Leu  
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 Glu Ser Ala Leu Gly Arg Asp Glu Thr Ala Ile Thr Val Ala Asp Ile  
 2420 2425 2430  
 Asp Trp Asp Arg Phe Tyr Leu Ala Tyr Ser Ser Gly Arg Pro Gln Pro  
 2435 2440 2445  
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 Ser Ala Thr Ser Gly Gln Gly Gly Ser Ser Ala Gln Gly Ala Asn Pro  
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 2500 2505 2510  
 Ser Pro Glu Asp Val Ala Ala Asp Arg Ala Phe Lys Asp Ile Gly Phe  
 2515 2520 2525  
 Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu Thr Arg Ala Thr  
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 Gly Leu Gln Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr Pro Leu  
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 Ala Leu Val Ser Leu Leu Arg Ser Glu Phe Leu Gly Asp Glu Glu Thr  
 2565 2570 2575  
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 2580 2585 2590  
 Ala Gly Ala Gly Ala Gly Thr Asp Ala Asp Asp Asp Pro Ile Ala Ile  
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 Val Ala Met Ser Cys Arg Tyr Pro Gly Asp Ile Arg Ser Pro Glu Asp  
 2610 2615 2620  
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 Thr Asp Arg Gly Trp Asp Leu Asp Gly Leu Tyr Asp Ala Asp Pro Asp  
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Gly Val Phe Ile Gly Leu Ser Tyr Gln Asp Tyr Ala Ala Arg Val Pro  
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 Asn Ala Pro Arg Gly Val Glu Gly Tyr Leu Leu Thr Gly Ser Thr Pro  
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 Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Gly Gly  
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 Glu Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val Glu  
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 Gly Leu Tyr Asp Pro Asn Pro Glu Ala Thr Gly Lys Ser Tyr Ala Arg  
 85 90 95  
 Glu Ala Gly Phe Leu Tyr Glu Ala Gly Glu Phe Asp Ala Asp Phe Phe  
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 Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu  
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 Leu Leu Glu Ala Ser Trp Glu Ala Phe Glu His Ala Gly Ile Pro Ala  
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 His Asp Tyr Ala Thr Arg Leu Thr Asp Val Pro Glu Gly Ile Glu Gly  
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 Tyr Thr Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys  
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Pro	Ala	Ala	Glu	Glu	Thr	Pro	Ala	Ser	Glu	Ala	Thr	Pro	Ala	Val	Glu		
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Pro	Arg	Thr	Pro	Glu	Val	Pro	Phe	Phe	Ser	Thr	Leu	Glu	Gly	Ala	Trp		
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Pro	Val	Asp	Glu	Asp	Ala	Pro	Ala	Asp	Glu	Pro	Ser	Val	Gly	Gly	Val	1970	1975	1980
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Met	Gly	Ala	Glu	Leu	Leu	Asp	Val	Ser	Lys	Glu	Phe	Ala	Ala	Ala	Met	2075	2080	2085
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Ser	Leu	Leu	Pro	Thr	Thr	Thr	His	Pro	Asp	Leu	Pro	Thr	Tyr	Ala		2360	2365	2370
Phe	Gln	Thr	Glu	Arg	Tyr	Trp	Pro	Gln	Pro	Asp	Leu	Ser	Ala	Ala	Gly	2375	2380	2385
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<212> DNA

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Leu Thr Thr Ala Trp Glu Ala Ile Glu Ser Ala Gly Ile Asp Pro Thr
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Ala Leu Lys Gly Ser Gly Leu Gly Val Phe Val Gly Gly Trp His Thr
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Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly Arg Ile
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Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp Thr Ala
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Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Ala Pro Gly
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Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Glu Lys Ser
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Ala	Gln	Ile	Gly	Gln	Leu	Ala	Ala	Tyr	Ala	Asp	Gly	Arg	Thr	Asp	Val	500	505	510
Asp	Pro	Ala	Val	Ala	Ala	Arg	Ala	Leu	Val	Asp	Ser	Arg	Thr	Ala	Met	515	520	525
Glu	His	Arg	Ala	Val	Ala	Val	Gly	Asp	Ser	Arg	Glu	Ala	Leu	Arg	Asp	530	535	540
Ala	Leu	Arg	Met	Pro	Glu	Gly	Leu	Val	Arg	Gly	Thr	Ser	Ser	Asp	Val	545	550	555
Gly	Arg	Val	Ala	Phe	Val	Phe	Pro	Gly	Gln	Gly	Thr	Gln	Trp	Ala	Gly	565	570	575
Met	Gly	Ala	Glu	Leu	Leu	Asp	Ser	Ser	Pro	Glu	Phe	Ala	Ala	Ser	Met	580	585	590
Ala	Glu	Cys	Glu	Thr	Ala	Leu	Ser	Arg	Tyr	Val	Asp	Trp	Ser	Leu	Glu	595	600	605
Ala	Val	Val	Arg	Gln	Glu	Pro	Gly	Ala	Pro	Thr	Leu	Asp	Arg	Val	Asp	610	615	620
Val	Val	Gln	Pro	Val	Thr	Phe	Ala	Val	Met	Val	Ser	Leu	Ala	Lys	Val	625	630	635
Trp	Gln	His	His	Gly	Ile	Thr	Pro	Gln	Ala	Val	Val	Gly	His	Ser	Gln	645	650	655
Gly	Glu	Ile	Ala	Ala	Ala	Tyr	Val	Ala	Gly	Ala	Leu	Thr	Leu	Asp	Asp	660	665	670
Ala	Ala	Arg	Val	Val	Thr	Leu	Arg	Ser	Lys	Ser	Ile	Ala	Ala	His	Leu	675	680	685
Ala	Gly	Lys	Gly	Gly	Met	Ile	Ser	Leu	Ala	Leu	Asp	Glu	Ala	Ala	Val	690	695	700
Leu	Lys	Arg	Leu	Ser	Asp	Phe	Asp	Gly	Leu	Ser	Val	Ala	Ala	Val	Asn	705	710	715
Gly	Pro	Thr	Ala	Thr	Val	Val	Ser	Gly	Asp	Pro	Thr	Gln	Ile	Glu	Glu	725	730	735
Leu	Ala	Arg	Thr	Cys	Glu	Ala	Asp	Gly	Val	Arg	Ala	Arg	Ile	Ile	Pro	740	745	750
Val	Asp	Tyr	Ala	Ser	His	Ser	Arg	Gln	Val	Glu	Ile	Ile	Glu	Lys	Glu	755	760	765
Leu	Ala	Glu	Val	Leu	Ala	Gly	Leu	Ala	Pro	Gln	Ala	Pro	His	Val	Pro	770	775	780
Phe	Phe	Ser	Thr	Leu	Glu	Gly	Thr	Trp	Ile	Thr	Glu	Pro	Val	Leu	Asp	785	790	795
Gly	Thr	Tyr	Trp	Tyr	Arg	Asn	Leu	Arg	His	Arg	Val	Gly	Phe	Ala	Pro	805	810	815
Ala	Val	Glu	Thr	Leu	Ala	Val	Asp	Gly	Phe	Thr	His	Phe	Ile	Glu	Val	820	825	830
Ser	Ala	His	Pro	Val	Leu	Thr	Met	Thr	Leu	Pro	Glu	Thr	Val	Thr	Gly	835	840	845
Leu	Gly	Thr	Leu	Arg	Arg	Glu	Gln	Gly	Gly	Gln	Glu	Arg	Leu	Val	Thr	850	855	860
Ser	Leu	Ala	Glu	Ala	Trp	Ala	Asn	Gly	Leu	Thr	Ile	Asp	Trp	Ala	Pro	865	870	875
Ile	Leu	Pro	Thr	Ala	Thr	Gly	His	His	Pro	Glu	Leu	Pro	Thr	Tyr	Ala	885	890	895



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Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr Ala Ser  
915 920 925  
Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly Ser Glu  
930 935 940  
Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala Glu Val  
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965 970 975  
Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val Val Ser  
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Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser Gly Ala  
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Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala Val Val  
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Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala Leu Ser  
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Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu Thr Leu  
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 Val Arg Thr His Ala Ala Val Leu Gly His Ser Ser Pro Asp Arg  
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 Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser Leu Thr  
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 Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu Ala Ala  
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 His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro Thr Asp  
 1475 1480 1485  
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 1490 1495 1500  
 Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr Gly Ile  
 1505 1510 1515 1520  
 Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala Asp Pro  
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<210> 36

<211> 4041

<212> DNA

<213> *Streptomyces venezuelae*

<400> 36

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<210> 37

<211> 1346

<212> PRT

<213> Streptomyces venezuelae

<400> 37

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Lys	Glu	Asn	Glu	Glu	Leu	Arg	Lys	Glu	Ser	Arg	Arg	Arg	Ala	Asp	Arg
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Arg	Gln	Glu	Pro	Met	Ala	Ile	Val	Gly	Met	Ser	Cys	Arg	Phe	Ala	Gly
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Gly	Ile	Arg	Ser	Pro	Glu	Asp	Leu	Trp	Asp	Ala	Val	Ala	Ala	Gly	Lys
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Asp	Leu	Val	Ser	Glu	Val	Pro	Glu	Glu	Arg	Gly	Trp	Asp	Ile	Asp	Ser
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Leu	Tyr	Asp	Pro	Val	Pro	Gly	Arg	Lys	Gly	Thr	Thr	Tyr	Val	Arg	Asn
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Ala	Ala	Phe	Leu	Asp	Asp	Ala	Ala	Gly	Phe	Asp	Ala	Ala	Phe	Phe	Gly
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Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Gln	Leu
		115				120					125				
Leu	Glu	Ala	Ser	Trp	Glu	Val	Phe	Glu	Arg	Ala	Gly	Ile	Asp	Pro	Ala
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Ser	Val	Arg	Gly	Thr	Asp	Val	Gly	Val	Tyr	Val	Gly	Cys	Gly	Tyr	Gln
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Asp	Tyr	Ala	Pro	Asp	Ile	Arg	Val	Ala	Pro	Glu	Gly	Thr	Gly	Gly	Tyr	
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Val	Val	Thr	Gly	Asn	Ser	Ser	Ala	Val	Ala	Ser	Gly	Arg	Ile	Ala	Tyr	
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Ser	Leu	Gly	Leu	Glu	Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	
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Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Leu	Lys	Gly	Leu	Arg	Asn	Gly	
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Asp	Cys	Ser	Thr	Ala	Leu	Val	Gly	Gly	Val	Ala	Val	Leu	Ala	Thr	Pro	
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Gly	Ala	Phe	Ile	Glu	Phe	Ser	Ser	Gln	Gln	Ala	Met	Ala	Ala	Asp	Gly	
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Gly	Val	Ala	Val	Leu	Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg	Arg	Lys	
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Glu	Ala	Gln	Ala	Leu	Leu	Ala	Thr	Tyr	Gly	Gln	Gly	Arg	Ala	Pro	Gly	
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Gln	Pro	Leu	Arg	Leu	Gly	Thr	Leu	Lys	Ser	Asn	Ile	Gly	His	Thr	Gln	
	370					375					380					
Ala	Ala	Ser	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Gln	Ala	Leu	Arg	
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His	Gly	Val	Leu	Pro	Lys	Thr	Leu	His	Val	Asp	Glu	Pro	Thr	Asp	Gln	
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865					870					875					880
Pro	Ala	Thr	Gly	Ala	Leu	Ser	Pro	Ala	Val	Pro	Asp	Leu	Pro	Thr	Tyr
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Cys	Asp	Ser	Pro	Glu	Glu	Val	Pro	Val	Asp	Arg	Pro	Leu	Arg	Glu	Ile
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Gln	Phe	Ala	Ser	Pro	Glu	Ala	Cys	Ser	Glu	Arg	Leu	Asp	Pro	Val	Leu
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 Pro Ala Gly Ile Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu  
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 Pro Ile Glu Val Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly  
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 Ala Arg Phe Leu Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val  
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 Gly Asp Trp Arg Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val  
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 Pro Gly Asp His Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala  
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 Gly Lys  
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 <211> 1251  
 <212> DNA  
 <213> Streptomyces venezuelae

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35 40 45  
Gly Asp Glu Val Trp Leu Val Val Gly Tyr Asp Arg Ala Arg Ala Val  
50 55 60  
Leu Ala Asp Pro Arg Phe Ser Lys Asp Trp Arg Asn Ser Thr Thr Pro  
65 70 75 80  
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85 90 95  
Pro Pro Arg His Thr Arg Leu Arg Lys Leu Val Ala Arg Glu Phe Thr  
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115 120 125  
Gly Leu Val Asp Ala Met Leu Ala Ala Pro Asp Gly Arg Ala Asp Leu  
130 135 140  
Met Glu Ser Leu Ala Trp Pro Leu Pro Ile Thr Val Ile Ser Glu Leu  
145 150 155 160  
Leu Gly Val Pro Glu Pro Asp Arg Ala Ala Phe Arg Val Trp Thr Asp  
165 170 175  
Ala Phe Val Phe Pro Asp Asp Pro Ala Gln Ala Gln Thr Ala Met Ala  
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Glu Met Ser Gly Tyr Leu Ser Arg Leu Ile Asp Ser Lys Arg Gly Gln  
195 200 205  
Asp Gly Glu Asp Leu Leu Ser Ala Leu Val Arg Thr Ser Asp Glu Asp  
210 215 220  
Gly Ser Arg Leu Thr Ser Glu Glu Leu Leu Gly Met Ala His Ile Leu  
225 230 235 240  
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245 250 255  
Tyr Ala Leu Leu Ser His Pro Asp Gln Leu Ala Ala Leu Arg Ala Asp  
260 265 270  
Met Thr Leu Leu Asp Gly Ala Val Glu Glu Met Leu Arg Tyr Glu Gly  
275 280 285  
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290 295 300  
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305 310 315 320  
Asp Ala His Arg Thr Pro Glu Arg Phe Pro Asp Pro His Arg Phe Asp  
325 330 335  
Ile Arg Arg Asp Thr Ala Gly His Leu Ala Phe Gly His Gly Ile His  
340 345 350  
Phe Cys Ile Gly Ala Pro Leu Ala Arg Leu Glu Ala Arg Ile Ala Val  
355 360 365  
Arg Ala Leu Leu Glu Arg Cys Pro Asp Leu Ala Leu Asp Val Ser Pro  
370 375 380  
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<211> 2787

<212> DNA

<213> *Streptomyces venezuelae*

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120

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<211> 928

<212> PRT

<213> Streptomyces venezuelae

<400> 41

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Asp	Arg	Asp	Ile	Pro	Leu	Gly	Val	Leu	Cys	Gln	Leu	Leu	Arg	Ser	Ala
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Thr	Ala	Ser	Leu	Arg	Phe	Leu	Leu	Tyr	Cys	Ala	Ala	His	His	Asp	Gln
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Gly	Gly	Ile	Gly	Phe	Val	Met	Thr	Glu	Arg	Ala	Ser	Gln	Arg	Ala	Gly
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Met	Trp	Leu	Ser	Gly	Leu	Pro	Pro	Ser	Gly	Val	Arg	Gln	Leu	Leu	Ala
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His	Tyr	Tyr	Gly	Pro	Glu	Ala	Ala	Glu	Arg	Arg	Ala	Pro	Ala	Tyr	His
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Arg	Gln	Ala	Ser	His	Thr	Thr	Leu	Gly	Ala	Ala	Gly	Gly	Asp	Glu	Pro
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Val	His	Gly	Asp	Ala	Phe	Ala	Gln	Ala	Val	Leu	Asp	Cys	Leu	His	Arg
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Glu	Asp	Gly	Thr	Leu	Gly	Gln	Pro	Ala	Ile	Arg	Glu	Ala	Ala	Leu	Gln
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		355					360					365			
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Arg	Ile	Leu	Glu	Phe	Ala	Val	Arg	Ser	Ser	Thr	Asp	Asn	Thr	Gln	Leu
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Ala	Arg	Leu	Ala	Pro	His	Leu	Val	Ala	Ala	Ser	Trp	Arg	Met	Asn	Pro
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Glu	Leu	Pro	Pro	Ser	His	Pro	Val	Met	Ala	Leu	Ile	Arg	Cys	Leu	Val
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Pro	Ser	Ser	Asp	Asn	Asp	Ala	Leu	Glu	Leu	Ser	Leu	Thr	Arg	Met	Trp
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Glu	Thr	Tyr	Glu	Ala	Leu	Glu	Thr	Ala	Leu	Leu	Val	Leu	Val	His	Ala
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Arg	Ala	Met	Ile	Ala	Ile	Arg	Cys	Gly	Asp	Leu	Pro	Thr	Ala	Arg	Glu
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Arg	Ala	Glu	Leu	Ala	Leu	Ser	His	Ala	Ala	Pro	Glu	Ser	Trp	Gly	Leu
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Ala	Val	Gly	Met	Pro	Leu	Ser	Ala	Leu	Leu	Ala	Cys	Thr	Glu	Ala	
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Ala	Met	Phe	Asp	Ser	Arg	His	Gly	Met	Glu	Tyr	Met	His	Ala	Arg	Gly
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Ile	Val	Pro	Trp	Arg	Thr	Ser	Ala	Ala	Glu	Val	Tyr	Leu	Arg	Leu	Gly
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Asn	Arg	Gln	Lys	Ala	Arg	Ala	Leu	Ala	Glu	Ala	Gln	Leu	Ala	Leu	Val
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		785			790					795					800
Ala	Gly	Met	Ser	Arg	His	Gln	Gln	Ala	Gln	Gly	Asp	Asn	Tyr	Arg	Ala
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Lys	Ala	Val	Ser	Thr	Glu	Leu	Glu	Leu	Pro	Gly	Gly	Pro	Asp	Val	Gly
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Leu	Thr	Asn	Arg	Gln	Ile	Ala	Arg	Arg	Leu	Cys	Val	Thr	Ala	Ser	Thr
			885					890						895	
Val	Glu	Gln	His	Leu	Thr	Arg	Val	Tyr	Arg	Lys	Leu	Asn	Val	Thr	Arg
		900						905				910			
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27

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 ggatccgcgc cgggatgttc cgcgccctgt 30  
  
 <210> 49  
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 <212> DNA  
 <213> Streptomyces venezuelae  
  
 <400> 49  
 aaaatgcatc agaggtctgt cggtcacttg c 31  
  
 <210> 50  
 <211> 41  
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 <213> Streptomyces venezuelae  
  
 <400> 50  
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 <210> 51  
 <211> 32  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 51  
 aaaagatctc caacgaacag ttggtggacg ct

32

<210> 52  
 <211> 846  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 52  
 gtgaccgaca gacctctgaa cgtggacagc ggactgtgga tccggcgctt ccaccccgcg 60  
 ccgaacagcg cgggtgcggt ggtctgcctg ccgcacgccg gcggctccgc cagctacttc 120  
 ttccgcttct cggaggagct gcacccctcc gtcgaggccc tgtcggtgca gtatccgggc 180  
 cgccaggacc ggcgtgccga gccgtgtctg gagagcgtcg aggagctcgc cgagcatgtg 240  
 gtcgcggcca ccgaacctg gtggcaggag ggccggctgg ccttcttcgg gcacagcctc 300  
 ggcgcctccg tcgccttcga gacggcccgc atcctggaac agcggcacgg ggtacggccc 360  
 gagggcctgt acgtctccgg tcggcgcgcc ccgtcgtggt gcgggaccg gctcgtccac 420  
 cagctggacg accgggctgt cctggccgag atccggcggc tcagcggcac cgacgagcgg 480  
 ttctccagg acgacgagct gctgcggctg gtgctgcccg cgctgcgcag cgactacaag 540  
 gcggcggaga cgtacctgca ccggccgtcc gccaaagctca cctgcccggg gatggccctg 600  
 gccggcgacc gtgacccgaa ggcgcgcgtg aacgaggtgg ccgagtggcg tcggcacacc 660  
 agcggggcgt tctgcctccg ggcgtactcc ggcggccact tctacctcaa cgaccagtgg 720  
 cagcagatct gcaacgacat ctccgaccac ctgctcgtca cccgcggcgc gcccgatgcc 780  
 cgcgtcgtgc agccccgac cagccttatc gaaggagcgg cgaagagatg gcagaacca 840  
 cgggtga 846

<210> 53  
 <211> 281  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 53  
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 Phe His Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His  
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 Ala Gly Gly Ser Ala Ser Tyr Phe Arg Phe Ser Glu Glu Leu His  
 35 40 45  
 Pro Ser Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg  
 50 55 60  
 Arg Ala Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val  
 65 70 75 80  
 Val Ala Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe  
 85 90 95  
 Gly His Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu  
 100 105 110  
 Glu Gln Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg  
 115 120 125  
 Arg Ala Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp  
 130 135 140  
 Arg Ala Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg  
 145 150 155 160  
 Phe Leu Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg  
 165 170 175  
 Ser Asp Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys  
 180 185 190  
 Leu Thr Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala  
 195 200 205  
 Pro Leu Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe  
 210 215 220  
 Cys Leu Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp  
 225 230 235 240

His Glu Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly  
                   245                  250                  255  
 Ala Pro Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly  
                   260                  265                  270  
 Ala Ala Lys Arg Trp Gln Asn Pro Arg  
                   275                  280

<210> 54  
 <211> 404  
 <212> DNA  
 <213> *Streptomyces venezuelae*

<400> 54  
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 tcaccggaat cgagcccgag ccggtgtccg gcggcccgcc cgacggcgcc ggggaccccg 120  
 gtgcggagcc ggagccggag acgtcgatcg acgacctga cgccgaggcc ctgatccgga 180  
 tggctctcgg ccgcgggaac acctgacccg accgcggcca cggcccgcac accgccaggt 240  
 gccgtcaggc accacccgca cccctgcccc ccacacgccc acaaccccat ccacgagcgg 300  
 aagaccacac ccagatgacg agttccaacg agcagttggt ggacgctctg cgcgcctccc 360  
 tcaaggagaa cgaagaactc cggaaagaga gccgtcgccg ggac 404

<210> 55  
 <211> 437  
 <212> DNA  
 <213> *Streptomyces narbonensis*

<400> 55  
 tggccgaact gccctcgac cggctgcggg acgccggggt cctcgacacc gtcctgcgac 60  
 tcaccggcat cgagcccgag ccggtgcccg gcggcccggg cagcgtcgcc gccggccccg 120  
 ccgcggatcc ggaaccggag acgtcgatcg acgacctga cgccgaggcc ctgatccgga 180  
 tggctctcgg ccgcgggaac gcctgagcac ccgccccggc ccgtggctgc cccggccctt 240  
 gcccgactgc gggccggggc ccgggcccgc acaccgccac gtaccacccc gcaccaccgc 300  
 cccccacacg cccacaacgc catccacgag cgggaagacca caccagatg acgagttcca 360  
 acgagcagtt ggtggacgct ctgcgcgcct ccctcaagga gaacgaagaa ctccggaaag 420  
 agagccgtcg ccgggac 437

<210> 56  
 <211> 327  
 <212> DNA  
 <213> *Streptomyces venezuelae*

<400> 56  
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 gaccgacagc gttctgaacg tggacggcaa cctgtggatc cggcgcttcc atccctcgcc 120  
 gaacagcgcg gtgcgactgg tctgcctgcc ccatgccggc ggctccgcca gctacttctt 180  
 ccgcttctcg gaggagctcc acccctcggt cgaggccctg tcggtgcagt acccgggccg 240  
 ccaggaccgg cgtgccgagc cgtgcctgga gagcgtcgag gagctggccg agcacgtggt 300  
 cgcggccacc gaaccctggt ggcagga 327

<210> 57  
 <211> 327  
 <212> DNA  
 <213> *Streptomyces narbonensis*

<400> 57  
 tcgacggcat cgagcgggac accgccgcgg ggccggcgac cgcgcagggg gcggaccagt 60  
 gaccgacaga gttctgaacg tggacagcag cctgtggatc cgacgcttcc acccctcgcc 120  
 gaacagcgcg gtgcggctgg tctgtctgcc gcacgccggg ggttccgcca gctacttctt 180  
 ccgcttctcg gaggagctcc acccctcggt cgaggccttg tcggtgcagt acccgggccg 240  
 ccaggaccgg cgtgccgagc cgtgtctgga gaacgtcgag gagctcgccg agcacgtggt 300  
 cgcggccacc gaagcctggt ggcggga 327

<210> 58  
 <211> 25  
 <212> PRT  
 <213> A. eutrophus

<400> 58  
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 Gln Pro Phe Lys Val Thr Pro Gly Pro  
 20 25

<210> 59  
 <211> 19  
 <212> PRT  
 <213> A. eutrophus

<400> 59  
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 1 5 10 15  
 Pro Gly Pro

<210> 60  
 <211> 16  
 <212> PRT  
 <213> A. eutrophus

<400> 60  
 Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr Pro Gly Pro  
 1 5 10 15

<210> 61  
 <211> 585  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 61  
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 1 5 10 15  
 Ile Pro Gly Tyr Arg Ala Arg Ile Leu Asn Met Ser Asn Lys Asn Asn  
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 Asp Glu Leu Gln Arg Gln Ala Ser Glu Asn Thr Leu Gly Leu Asn Pro  
 35 40 45  
 Val Ile Gly Ile Arg Arg Lys Asp Leu Leu Ser Ser Ala Arg Thr Val  
 50 55 60  
 Leu Arg Gln Ala Val Arg Gln Pro Leu His Ser Ala Lys His Val Ala  
 65 70 75 80  
 His Phe Gly Leu Glu Leu Lys Asn Val Leu Leu Gly Lys Ser Ser Leu  
 85 90 95  
 Ala Pro Glu Ser Asp Asp Arg Arg Phe Asn Asp Pro Ala Trp Ser Asn  
 100 105 110  
 Asn Pro Leu Tyr Arg Arg Tyr Leu Gln Thr Tyr Leu Ala Trp Arg Lys  
 115 120 125  
 Glu Leu Gln Asp Trp Ile Gly Asn Ser Asp Leu Ser Pro Gln Asp Ile  
 130 135 140  
 Ser Arg Gly Gln Phe Val Ile Asn Leu Met Thr Glu Ala Met Ala Pro  
 145 150 155 160  
 Thr Asn Thr Leu Ser Asn Pro Ala Ala Val Lys Arg Phe Phe Glu Thr  
 165 170 175  
 Gly Gly Lys Ser Leu Leu Asp Gly Leu Ser Asn Leu Ala Lys Asp Leu  
 180 185 190

Val	Asn	Asn	Gly	Gly	Met	Pro	Ser	Gln	Val	Asn	Met	Asp	Ala	Phe	Glu
	195						200					205			
Val	Gly	Lys	Asn	Leu	Gly	Thr	Ser	Glu	Gly	Ala	Val	Val	Tyr	Arg	Asn
	210					215					220				
Asp	Val	Leu	Glu	Leu	Ile	Gln	Tyr	Lys	Pro	Ile	Thr	Glu	Gln	Val	His
225					230					235					240
Ala	Arg	Pro	Leu	Leu	Val	Val	Pro	Pro	Gln	Ile	Asn	Lys	Phe	Tyr	Val
			245						250					255	
Phe	Asp	Leu	Ser	Pro	Glu	Lys	Ser	Leu	Ala	Arg	Tyr	Cys	Leu	Arg	Ser
		260						265					270		
Gln	Gln	Gln	Thr	Phe	Ile	Ile	Ser	Trp	Arg	Asn	Pro	Thr	Lys	Ala	Gln
		275					280					285			
Arg	Glu	Trp	Gly	Leu	Ser	Thr	Tyr	Ile	Asp	Ala	Leu	Lys	Glu	Ala	Val
	290					295					300				
Asp	Ala	Val	Leu	Ala	Ile	Thr	Gly	Ser	Lys	Asp	Leu	Asn	Met	Leu	Gly
305					310					315					320
Ala	Cys	Ser	Gly	Gly	Ile	Thr	Cys	Thr	Ala	Leu	Val	Gly	His	Tyr	Ala
			325						330					335	
Ala	Leu	Gly	Glu	Asn	Lys	Val	Asn	Ala	Leu	Thr	Leu	Leu	Val	Ser	Val
		340						345					350		
Leu	Asp	Thr	Thr	Met	Asp	Asn	Gln	Val	Ala	Leu	Phe	Val	Asp	Glu	Gln
	355					360						365			
Thr	Leu	Glu	Ala	Ala	Lys	Arg	His	Ser	Tyr	Gln	Ala	Gly	Val	Leu	Glu
	370					375					380				
Gly	Ser	Glu	Met	Ala	Lys	Val	Phe	Ala	Trp	Met	Arg	Pro	Asn	Asp	Leu
385					390					395					400
Ile	Trp	Asn	Tyr	Trp	Val	Asn	Asn	Tyr	Leu	Leu	Gly	Asn	Glu	Pro	Pro
			405						410					415	
Val	Phe	Asp	Ile	Leu	Phe	Trp	Asn	Asn	Asp	Thr	Thr	Arg	Leu	Pro	Ala
		420					425						430		
Ala	Phe	His	Gly	Asp	Leu	Ile	Glu	Met	Phe	Lys	Ser	Asn	Pro	Leu	Thr
	435						440					445			
Arg	Pro	Asp	Ala	Leu	Glu	Val	Cys	Gly	Thr	Pro	Ile	Asp	Leu	Lys	Gln
	450					455					460				
Val	Lys	Cys	Asp	Ile	Tyr	Ser	Leu	Ala	Gly	Thr	Asn	Asp	His	Ile	Thr
465					470					475					480
Pro	Trp	Gln	Ser	Cys	Tyr	Arg	Ser	Ala	His	Leu	Phe	Gly	Gly	Lys	Ile
			485						490					495	
Glu	Phe	Val	Leu	Ser	Asn	Ser	Gly	His	Ile	Gln	Ser	Ile	Leu	Asn	Pro
		500						505					510		
Pro	Gly	Asn	Pro	Lys	Ala	Arg	Phe	Met	Thr	Gly	Ala	Asp	Arg	Pro	Gly
	515						520					525			
Asp	Pro	Val	Ala	Trp	Gln	Glu	Asn	Ala	Thr	Lys	His	Ala	Asp	Ser	Trp
	530					535					540				
Trp	Leu	His	Trp	Gln	Ser	Trp	Leu	Gly	Glu	Arg	Ala	Gly	Glu	Leu	Glu
545					550					555					560
Lys	Ala	Pro	Thr	Arg	Leu	Gly	Asn	Arg	Ala	Tyr	Ala	Ala	Gly	Glu	Ala
			565						570					575	
Ser	Pro	Gly	Thr	Tyr	Val	His	Glu	Arg							
		580						585							

<210> 62

<211> 268

<212> PRT

<213> Streptomyces venezuelae

<400> 62

Ile	Arg	Arg	Phe	His	Pro	Ala	Pro	Asn	Ser	Ala	Val	Arg	Leu	Val	Cys
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Leu	Pro	His	Ala	Gly	Gly	Ser	Ala	Ser	Tyr	Phe	Phe	Arg	Phe	Ser	Glu
			20					25						30	

Glu	Leu	His	Pro	Ser	Val	Glu	Ala	Leu	Ser	Val	Gln	Tyr	Pro	Gly	Arg
	35						40				45				
Gln	Asp	Arg	Arg	Ala	Glu	Pro	Cys	Leu	Glu	Ser	Val	Glu	Glu	Leu	Ala
	50					55					60				
Glu	His	Val	Val	Ala	Ala	Thr	Glu	Pro	Trp	Trp	Gln	Glu	Gly	Arg	Leu
	65				70					75					80
Ala	Phe	Phe	Gly	His	Ser	Leu	Gly	Ala	Ser	Val	Ala	Phe	Glu	Thr	Ala
				85					90					95	
Arg	Ile	Leu	Glu	Gln	Arg	His	Gly	Val	Arg	Pro	Glu	Gly	Leu	Tyr	Val
			100					105					110		
Ser	Gly	Arg	Arg	Ala	Pro	Ser	Leu	Ala	Pro	Asp	Arg	Leu	Val	His	Gln
		115					120					125			
Leu	Asp	Asp	Arg	Ala	Phe	Leu	Ala	Glu	Ile	Arg	Arg	Leu	Ser	Gly	Thr
	130					135					140				
Asp	Glu	Arg	Phe	Leu	Gln	Asp	Asp	Glu	Leu	Leu	Arg	Leu	Val	Leu	Pro
	145				150					155					160
Ala	Leu	Arg	Ser	Asp	Tyr	Lys	Ala	Ala	Glu	Thr	Tyr	Leu	His	Arg	Pro
				165					170					175	
Ser	Ala	Lys	Leu	Thr	Cys	Pro	Val	Met	Ala	Leu	Ala	Gly	Asp	Arg	Asp
			180					185					190		
Pro	Lys	Ala	Pro	Leu	Asn	Glu	Val	Ala	Glu	Trp	Arg	Arg	His	Thr	Ser
		195					200						205		
Gly	Pro	Phe	Cys	Leu	Arg	Ala	Tyr	Ser	Gly	Gly	His	Phe	Tyr	Leu	Asn
	210					215					220				
Asp	Gln	Trp	His	Glu	Ile	Cys	Asn	Asp	Ile	Ser	Asp	His	Leu	Leu	Val
	225				230					235					240
Thr	Arg	Gly	Ala	Pro	Asp	Ala	Arg	Val	Val	Gln	Pro	Pro	Thr	Ser	Leu
				245					250					255	
Ile	Glu	Gly	Ala	Ala	Lys	Arg	Trp	Gln	Asn	Pro	Arg				
			260					265							